CR-165169

APPLICATIONS TECHNOLOGY SATELLITE
And
COMMUNICATIONS TECHNOLOGY SATELLITE
USER EXPERIMENTS FOR 1967-1980

REFERENCE BOOK
VOLUME III — USER FORM SURVEYS

Nicholas A. Engler
John F. Nash
Jerry D. Strange

UNIVERSITY OF DAYTON
RESEARCH INSTITUTE
DAYTON, OHIO 45469

August 1980
FINAL REPORT

PREPARED FOR:
NASA-LEWIS RESEARCH CENTER
CLEVELAND, OHIO 44135

NAS3-21370

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15. Supplementary Notes

Project Manager, L.C. Gentile, Communication and Application Division
NASA-Lewis Research Center, Cleveland, Ohio

16. Abstract

ATS-1, the first Applications Technology Satellite, was launched by the National Aeronautics and Space Administration in 1966. Since then ATS-3, 5 and 6, and the Communication Technology Satellite (CTS) have been successfully used for a large number of communications experiments and demonstrations. This report summarizes the important user experiments conducted during the fourteen year period from 1966 to 1980.

The report is in the form of a Reference Book and is divided into four volumes. Volume I contains a description of each of the satellites and a brief summary of each user experiment. Also in this volume is a Cross Index of User Experiments sorted by various parameters and a listing of keywords versus Experiment Number.

In Volume II the experiments are grouped by type of service offered; for example, education, health services, and data transmission. A bibliography of reports by accession number and by author are also presented. In this volume a listing of keywords versus report number is presented.

Volume III contains questionnaires received from the satellite users. Questionnaires were sent to users in 1976, 1977 and 1979. The forms reflect user viewpoints of the systems.

During the course of this work a number of reports, papers and articles were obtained and catalogued into an information retrieval system. Abstracts of some of these documents are listed in Volume IV.

This report is a continuation of a previous NASA Contractor's Report performed under Contracts NAS3-19699 and NAS3-20392

17. Key Words (Suggested by Author(s))	18. Distribution Statement
Alaska, Appalachia, ATS-1, ATS-3, ATS-5, ATS-6, Broadcasting, Communications, CTS, Data Transmission, Education, Health, Meteorology, Millimeter Wave, Peacesat, Ranging, Telecommunication, Wave Propagation.	UNCLASSIFIED - UNLIMITED

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UNCLASSIFIED	UNCLASSIFIED	340	

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NASA-C-168 Rev. 10-75)

VOLUME 3

ATS - USER FORMS

Early in the contract period NASA requested information concerning the user's reactions to the ATS/CTS program. UDRI designed a questionnaire and disseminated it to users at three different times in 1976, 1977 and 1979. The user form changed slightly from year to year.

The responses to the questionnaire are reproduced here as received.

SURVEY FORM FOR ATS USERS

1. NAME: JOHN KLEPPE

2. ADDRESS: P.O. Box 1171
Reno, NV 89504

3. DATE FORM COMPLETED
12/1975

4. DATE RECEIVED BY UD

001

5. TITLE OF EXPERIMENT: VHF SEEK

6. NAME/DESIGNATION OF SATELLITE ☒ ATS-1 ☒ ATS-3 ☐ ATS-5

Date Started | Date Ended

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☑ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☒ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☐ l. Other _____

8. OBJECTIVE OF EXPERIMENT:

To relay radar pictures in real time from aircraft to ground via VHF transponders. Check bit error rate vs. uplink power.

9. PARTICIPATING ORGANIZATION | ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
Sierra Research	Box 222, Buffalo, NY 14225
Scientific Engr. Systems	Box 1171, Reno, NV 89504

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
None		

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Report submitted to Sierra Research.

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

Radar pictures gathered from within eye of hurricane were transmitted between Boulder, Colorado and Reno, Nevada. Bit error rate vs. uplink power were obtained using VHF sub carrier methods (FSK) digital. Aircraft type antenna was used for uplink, helix antenna was used for receive.

13. OVERALL EVALUATION (Check one) Comments

- [x] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

Uplink power vs. bit error rate data were obtained using aircraft antenna for transmit and helix antenna for ground station.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

Proved concept of relaying real time radar data from aircraft to ground via a VHF transponder and low speed digital link (1200 BPS).

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

Radar data
Digital data
Real time

SURVEY FORM FOR ATS USERS

1. NAME: R. G. Lester	3. DATE FORM COMPLETED: September 13, 1975	002
2. ADDRESS: Dept. of Radiology Duke University Medical Center Durham, North Carolina 27710	4. DATE RECEIVED BY UD	

5. TITLE OF EXPERIMENT:

Transmission of Radiological Information by Satellite.

6. NAME/DESIGNATION OF SATELLITE ☒ ATS-1 ☐ ATS-3 ☐ ATS-5

Date Started November 15, 1971 | Date Ended November 15, 1971

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☒ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☐ l. Other Radiologic

8. OBJECTIVE OF EXPERIMENT:

To demonstrate the feasibility of transmitting the entire gamut of radiologic information, in real time, from remote to central locations, with no distance limitations and at reasonable cost.

9. PARTICIPATING ORGANIZATION ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
Dept. of Radiology, Duke University Medical Center	Durham, N. C. 27710

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
F. O'Foghludha	Duke Univ. Med. Center, Durham, N. C.	(919)684-2934

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. R. G. Lester, F. O'Foghludha, F. Porter, D. S. Friedman, H.R. Pedolsky. "Transmission of Radiologic Information by Satellite" Radiology 109, 731 (1973). (5 copies enclosed).

b. F. O'Foghludha, R. G. Lester, D. S. Friedman, H. R. Pedolsky. "Experimental Earth-Satellite Transmission of Radiological Information"

c. SPIE Semin, Proc. 43, 167 (1974). (Copies not available at Duke).

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

On November 15,1975 medical fluoroscopic information, previously videotaped at Duke Hospital, was transmitted for 60 minutes from Rosman, N.C. to ATS-1 and back; the satellite was then at about 150°W. The transmitted information had been obtained with conventional image-intensification systems using 525-line vidicon cameras and one-inch recorders. The signals were used to frequency-modulate a 6.2 GHz carrier radiated by a 1 kW transmitter working into the Rosman II dish. The "up" and "down" images were watched on adjacent monitors and the "down" image was videotaped as received. The transmitted and received images were indistinguishable to the naked eye and in photographed replays of the tapes, showing that the information capacity of the satellite link is adequate for fluoroscopic transmission at normal frame rates.

Radiographic (static) images obtained by viewing back-lighted radiographs with a Vidicon were also transmitted. These images were diagnostically unsatisfactory, but this was due to the poor quality of the image fed to the transmitter, rather than to inadequacies in the transmission channel.

X. OVERALL EVALUATION (Check one) Comments

- [x] a. Very useful; many benefits — If vigorously followed up!
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

12 ~~14~~. ACCOMPLISHMENTS AND/OR FAILURES OF EXPERIMENT

The feasibility of transmitting medical fluoroscopic images over very large distances without loss of diagnostic information was conclusively demonstrated for the first time. It was also shown that the limitation to transmitting static (radiographic) images in real time is set by the sensor used to feed the images to the transmitter and bot by the satellite link.

The experiment demonstrates conclusively that on-line radiologic examination in central locations is possible, making specialized service available at remote recording points which, for many examinations, could be manned by nonspecialists.

13 ~~15~~. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

Positive aspects: The demonstration that service as described in question 14 can be made continuously available is extremely valuable and points the way to satisfying demands for specialized manpower, for continuous emergency service, and for reduced patient and administrative costs in areas now without fulltime radiologic coverage.

Negative aspects: The initial success of the experiment, which attracted much attention in medical circles in the U.S. and abroad, has not been followed up, although the solution of the principal remaining problem (devising an optical sensor for high-detail static images) is well within the existing technology, and has in fact been partially solved in satellite cloud-cover experiments. We strongly urge that this be pursued, as representing a considerable gain at modest expense.

~~16~~ KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

Flurososcopy
Health Care
Images
Image Transmission
Medical Care
Medical Manpower
Radiography
Radiologists
Radiology
Satellites
Television
Videotape
X-rays

SURVEY FORM FOR ATS USERS

1. NAME: WILTON STURGES

2. ADDRESS: Dept. Oceanography
Florida State University
Tallahassee, FL 32306

3. DATE FORM COMPLETED
8-15-75

4. DATE RECEIVED BY UD
8-20-75

003

5. TITLE OF EXPERIMENT:

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☐ ATS-3 ☐ ATS-5

Date Started | Date Ended

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☐ l. Other Oceanography, Geodesy

8. OBJECTIVE OF EXPERIMENT:

I have tried to get sea-surface temperature data at high resolution; and high-accuracy altimeter data, at various times - but have not been directly involved in any specific experiments.

9. PARTICIPATING ORGANIZATION | ADDRESS

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a.

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

13. OVERALL EVALUATION (Check one) Comments

- ☐ a. Very useful; many benefits _____
- ☐ b. Useful _____
- ☐ c. Of some value _____
- ☐ d. No gain from experiment _____

14. ACCOMPLISHMENTS OF EXPERIMENT

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

SURVEY FORM FOR ATS USERS

1. NAME: Dr. Edward J. Zipser

2. ADDRESS: NCAR
P.O. Box 3000
Boulder CO 80303

3. DATE FORM COMPLETED: 8-18-75

4. DATE RECEIVED BY UD: 8-21-75

004

5. TITLE OF EXPERIMENT: (1) Line Islands Experiment (ATS-1), (2) Barbados Experiment (Joint Florida State Univ.-NCAR), (3) Bomex 1969

6. NAME/DESIGNATION OF SATELLITE ☒ ATS-1 ☒ ATS-3 ☐ ATS-5

Date Started (1) Feb. 1967; (2) Aug. 1968; (3) July 1969

Date Ended Analysis still continuing.

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☒ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☐ l. Other _____

8. OBJECTIVE OF EXPERIMENT:

Description of essential features of tropical atmosphere, mainly the role of cumulus connection in energetics of tropics.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
(1) NCAR	Same as above.
(2) NCAR	
(3) Many universities, NOAA (See #15)	

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
(See No. 15)		

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Zipser, E.J., 1970: The Line Islands Experiment, Its Place in Tropical Meteorology and the Rise of the Fourth School of Thought. Bull. Amer. Meteor. Soc. 51. 1136-1146.

b. Zipser, E.J., 1969: The Role of Organized Unsaturated Convective Downdrafts in the Structure & Rapid Decay of an Equatorial Disturbance. J.Appl.Meteor, 8, 799-814.

c. Zipser,E.J., 1969: Survey of Progress and Plans in Tropical Meteorology Experiments. Air Weather Service Tech Rept. 217, 178-188.

d. Smith, C.L.; E.J. Zipser, L. Sapp and S.M. Daggupaty, 1975: An Experiment in Tropical MesoscaleAnalysis, Accepted for publication in Mon. Wea. Res. 1975.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

See #15

13. OVERALL EVALUATION (Check one) Comments

- [x] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

Before ATS-1, there was no way to observe the time evolution of cloud systems of the tropics, except for those where once daily was sufficient. For most, it is not. Our work, and that of many of our colleagues, has placed us in the middle of a most exciting era, with GATE as the key experiment, where the tropical weather systems can be studied jointly by use of satellite and conventional data to advance our understanding of their role in the general circulation.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

The ATS 1, ATS-3 satellites have provided us with one of the basic components of our observational knowledge of the tropical atmosphere, upon which LIE, Barbados 68, BOMEX and now GATE depend. For many of us, it is as useless to try to isolate that portion of our "experiments" that is the "ATS portion" as it would be to isolate the role of a particular quarterback in the winning season of a football team. He may be essential, but would look a little silly without the other ten players. The LIE bibliography in Zipser (1970) attached, gives some idea of the variety of results from one of the experiments. If it is necessary to contact others, try for Barbados 68: Dr. Mike Garstang, Univ. of Virginia, Brooks Hall, Charlottesville, VA; for BOMEX 69: Dr. Joshua Holland, CEDDA/NOAA, Washington, D.C. 20235.

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

SURVEY FORM FOR ATS USERS

1. NAME: Richard D. Michelini

2. ADDRESS: Center for Astrophysics
60 Garden St.
Cambridge, Mass. 02138

3. DATE FORM COMPLETED: 9-5-75

4. DATE RECEIVED BY UD

005

5. TITLE OF EXPERIMENT:
Very-Long-Baseline-Interferometer Experiments

6. NAME/DESIGNATION OF SATELLITE ☒ ATS-1 ☒ ATS-3 ☒ ATS-5

Date Started May 1971 | Date Ended October 1972

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☒ l. Other Geodesy and Navigation and Tracking

8. OBJECTIVE OF EXPERIMENT:

To use time delay and fringe rate interferometry to determine precise orbits of geostationary satellites from these orbits and stellar interferometry to measure baselines on the surface of the earth.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
Goddard Space Flight Center	Greenbelt, MD
S. Ross and Co.	156 Milk, St., Boston, Mass.

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Mr. Bernard Rosenbaum	NASA-GSFC, Greenbelt, MD 20771	AC 301-982-5042
Dr. S. Ross	156 Milk St., Boston, Mass.	AC 617-482-9430

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Ramasastry et.al, Tracking of the ATS-3 Synchronous Satellite by the Very Long Baseline Interferometer (VLBI) Technique, NASA Document NASA/GSFC X-553-72-290, July 1972.

b. Michelini, R.D. and Grossi, M.D., VLBI Observations of Radio Emissions from Geostationary Satellites. Proceedings of 12th Cospar Conf. June 1971. Published by Akademie-Verlag, Berlin. 1972.

c. Ramasastry, Rosenbaum, Michelini, and Kuegler, Clock Synchronization Experiments Performed via the ATS-1 and ATS-3 Satellites. IEEE Transactions on Instrumentation and Measurement. Vol. IM-22, No. 1, March 1973

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

During four observing sessions, ATS-1, ATS-3 and ATS-5 satellites were tracked using VLBI at C and L-bands. Tracking was done using transcontinental baselines and STN or Radio Astronomy facilities. 237 satellite observations were made covering 25 hours of joint transcontinental observing time.

13. OVERALL EVALUATION (Check one)

Comments

- ☐ a. Very useful; many benefits
- ☒ b. Useful — Useful per se as tracking technique and also in calibrating natural radio source observations.
- ☐ c. Of some value
- ☐ d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

Tracking accuracy of thirty-five (35) meters was attained for ATS-1 and ATS-3 satellites. Known satellite spectra and power output was used to calibrate radio astronomy facilities. Real time transmission and processing of long baseline radio interferometry data was explored using the ATS satellites as models for data links.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

Orbit determination
Tracking
Very long baseline interferometry (VLBI)
Geoastronomy
Geodesy

SURVEY FORM FOR ATS USERS

1. NAME: Walter B. Parker

2. ADDRESS: 3724 Campbell Airstrip Road, Anchorage, Alaska 99504

3. DATE FORM COMPLETED: 8/21/75

4. DATE RECEIVED BY UD: 8/25/75

006

5. TITLE OF EXPERIMENT:
Action Study of Educational Uses of Satellite Communicat-ions in Remote Alaskan Communities

6. NAME/DESIGNATION OF SATELLITE [x] ATS-1 [ ] ATS-3 [ ] ATS-5

Date Started August 1971 | Date Ended On-Going

7. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. A/C Communications
- [ ] c. Broadcasting
- [ ] d. Data Transmission
- [x] e. Educational Applications
- [ ] f. Law Enforcement/ Criminal Justice
- [ ] g. Maritime Traffic Control
- [x] h. Medical/Health Applications
- [ ] i. Meteorology
- [ ] j. Navigation
- [ ] k. Voice Communication
- [ ] l. Other _____

8. OBJECTIVE OF EXPERIMENT:
Improve teacher effectiveness through access via ATS-1 to other sources.
Improve language skills of native children and adults.
Enhance cultural heritage.
Develop community services in education and health.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
State Operator Schools	650 W. Northern Lights, Anchorage
University of Alaska	Media Center, Fairbanks
Tanana Chiefs Native Assoc.	Fairbanks, Alasks

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Sue Pittman	Media Center, University of Alasks	
Duncan Read	State/Federal Land Use Planning Commission, Anchorage	279-9565
Melvin Charlie	Tanana Chiefs	
Robert Arnold	Alaska Native Foundation, Anchorage	

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Village Satellite, State Operated - Anchorage, Schools 0148

b. Village Satellite II, State Operated - Anchorage, Schools 0049

c. Village Satellite III, State Operated - Anchorage, Schools *607

d.

e.

f.

* N/A here - request from State Operated Schools
Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

Began with 26 sites spread across Alaska later reduced to 17 in the Yukon Valley with supporting sites in Anchorage, Fairbanks and Juneau. Target group was teachers, students, village health aids and village council members. Made two broadcasts per day (11:00 AM and 7:00 PM) 5 days a weeks for one hour. Varied subjects. Cooperating experimenters donated services.

13. OVERALL EVALUATION (Check one) Comments

- [x] a. Very useful; many benefits — See reports
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

See REPORTS

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

This project spent under $250K over a 3-year period. It learned the vital importance of interaction in any media presentations between lecturers and students. It also demonstrated that there was a good supply of audio software in most urban centers in Alasks & see report.

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

Interaction
Flexibility
Mobilization of Resources
Scattered Needs

SURVEY FORM FOR ATS USERS

1. NAME: Robert E. Graves

2. ADDRESS: Texas A&M University
Box 1675
Galveston, Texas 77550

3. DATE FORM COMPLETED: September 25, 1975

4. DATE RECEIVED BY UD

007

5. TITLE OF EXPERIMENT:
An Investigation of Sea Surface Temperatures

6. NAME/DESIGNATION OF SATELLITE [X] ATS-1 [X] ATS-3 [ ] ATS-5

Date Started | Date Ended

7. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. A/C Communications
- [ ] c. Broadcasting
- [X] d. Data Transmission
- [ ] e. Educational Applications
- [ ] f. Law Enforcement/ Criminal Justice
- [ ] g. Maritime Traffic Control
- [ ] h. Medical/Health Applications
- [X] i. Meteorology
- [ ] j. Navigation
- [X] k. Voice Communication
- [ ] l. Other _____

8. OBJECTIVE OF EXPERIMENT:

To study temperature of the surface of the ocean and attempt to relate the data to weather conditions.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
Texas A&M University	P. O. Box 1675
Moody College of Marine Sciences	Galveston, Texas 77550
& Maritime Resources	

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Dr. W. H. Clayton	Same as (10)	744-7161
Mr. Timothy Swarthout	Texas A&M University	847-4211
	College Station, Texas	

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. N/A

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

The experiment consisted in measuring sea surface temperatures using a Barnes precision infrared thermometer along the track of the vessel. Additional measurements were made by dumping seawater past a platinum resistance thermometer. Periodically, XBT's were launched along the track. In addition, the weather satellite photos were copied.

13. OVERALL EVALUATION (Check one) Comments

- [x] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

The data has not been analyzed yet.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

SURVEY FORM FOR ATS USERS

1. NAME: Erickson, C. E.

2. ADDRESS: Sandia Laboratories
Division 1715
Albuquerque, NM 87115

3. DATE FORM COMPLETED
September 4, 1975

4. DATE RECEIVED BY UD
September 2, 1975

44

5. TITLE OF EXPERIMENT: Command, RF System, and Distance Measuring Equipment Tests

6. NAME/DESIGNATION OF SATELLITE ☒ ATS-1 ☒ ATS-3 ☐ ATS-5

Date Started 10/16/71 | Date Ended 11-4-71

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☒ j. Navigation
- ☐ k. Voice Communication
- ☐ l. Other Antenae

8. OBJECTIVE OF EXPERIMENT:

Investigate feasibility of using satellites as data relays between fixed ground stations and mobile stations traveling throughout Continental USA.

9. PARTICIPATING ORGANIZATION | ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
Sandia Laboratories	Albuquerque, New Mexico

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
R. L. Eno	Sandia Laboratories, Div. 1736	417-844-2438

ORIGINAL PAGE IS OF POOR QUALITY

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number, or journal citation, d. .)

a. Eno, R. L., Sandia Laboratories, AEC HIGH NOTE Command, Radio Frequency System, and Distance Measuring Equipment (DME) Tests Using ATS-1 & 3 Synchronous Satellites.

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

A base station (fixed) was set up to transmit to the satellite on 149.183 MHz and receive on 135.563 from the satellites. The antennas were crossed dipole yagis, circularly polarized. The mobile station was similar except two antennas were used: a 5/8 λ vertical stub, and a horizontal crossed dipole array, phase for circular polarization end on.

Modulation was Manchester split-phase PCM/FM at deviation of ±6 KHz.

Digital commands were transmitted and data taken of decoder operation and demodulated signal quality, and signal margin observed.

DME tests were run in which the base station sent a ranging tone to the vehicle transponder and a digital phase meter measured the delay between transmitted and received signals. Closed loop measurements for base station and vehicle established equipment delays.

13. OVERALL EVALUATION (Check one)

- ☐ a. Very useful; many benefits
- ☒ b. Useful
- ☐ c. Of some value
- ☐ d. No gain from experiment

Comments

Proved magnitude of difficulty in one approach to original problem.

14. ACCOMPLISHMENTS OF EXPERIMENT

Experiment showed degrading effect of Faraday rotation: Signal margin varied widely, favoring vertical stub at times, and the crossed dipole at other times.

Position location was not attempted because of difficulties with the C-band antenna on ATS-3. Ranging tests were made to determine magnitude of scatter and range rate.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

Test was useful in proving use of unobtrusive antennas on vehicles to locate vehicles by means of DME & satellites was simply not possible. Since such an antenna is a requisite for our intended purpose, no further tests were performed.

The test helped familiarize Sandia personnel with satellite operational techniques.

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

Distance
Location
Command
Satellites

SURVEY FORM FOR ATS USERS

1. NAME: P. PONNAPPA

2. ADDRESS: COMMUNICATIONS RESEARCH CENTRE, SHIRLEY BAY, OTTAWA, ONTARIO, CANADA.

3. DATE FORM COMPLETED 27.8.75.

4. DATE RECEIVED BY UD

#47

5. TITLE OF EXPERIMENT: HIGH LATITUDE IONOSPHERIC FADING MEASUREMENTS AT 254 MhZ (L-BAND) AT CHURCHILL, MANITOBA.

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☐ ATS-3 ☒ ATS-5

Date Started July 1971 | Date Ended

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☒ b. A/C Communications
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☑ k. Voice Communication
- ☐ l. Other _____

8. OBJECTIVE OF EXPERIMENT:

a) TO DETERMINE FADING MARGIN REQUIREMENTS DUE TO IONOSPHERIC IRREGULARITIES DUE TO SCINTILLATION ETC., ON THE BASIS OF A STATISTICAL ANALYSIS.

b) TO DETERMINE POWER SPECTRUM OF IONOSPHERIC FADING SIGNALS AT L-BAND (1550 MhZ)

9. PARTICIPATING ORGANIZATION — ADDRESS

a) ~~NATIONAL AERONAUTICS & SPACE ADMINISTRATION,~~ — ~~U.S.A.~~

b) TELECOMMUNICATIONS & ELECTRONICS BRANCH, — ~~MINISTRY OF TRANSPORT, OTTAWA,~~ ONTARIO, CANADA.

c) COMMUNICATIONS RESEARCH CENTRE, — DEPARTMENT OF COMMUNICATIONS, SHIRLEY BAY, OTTAWA, ONTARIO, CANADA.

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
J. H. CHINNICK	COMMUNICATIONS RESEARCH CENTRE, DEPARTMENT OF COMMUNICATIONS, SHIRLEY BAY, OTTAWA, ONTARIO, CANADA.	(613)996-7051
E. LAMBERT	COMMUNICATIONS RESEARCH CENTRE, DEPARTMENT OF COMMUNICATIONS, SHIRLEY BAY, OTTAWA, ONTARIO. CANADA.	(613)996-7051
D. SELIN	COMMUNICATIONS RESEARCH CENTRE, DEPARTMENT OF COMMUNICATIONS, SHIRLEY BAY, OTTAWA, ONTARIO, CANADA.	(613)996-7051

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. P. PONNAPPA - High latitude ionospheric fading measurements at 254 Mhz (vhf) and 1550 Mhz (L-Band) at Churchill, Manitoba.

b. TER-RD-254 Ministry of Transport, Telecommunications & Electronics Branch, Ottawa, July 24,1973.

b. P(S) PONNAPPA - L-Band (1550 Mhz) Power Spectrum of Ionospheric Fading Signals.

c. Technical Memorandum, Serial No. SA/14/73. Communications Research Centre, Space Applications, November 27,1973.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

a) At Churchill an antenna receive gain of 27 dB was used in conjunction with a high sensitivity receiving system and associated strip chart and magnetic recorders. The analog signal was then digitized in order to obtain cumulative amplitude distributions from which fading margin requirements were determined.

b) The signal from the ATS-5 were recorded at Ottawa and Churchill. The digitized values of 1024 signal samples were then fed into a digital computer for power spectral density calculations using Fast Fourier Transform technique.

13. OVERALL EVALUATION (Check one)

- [x] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

Comments

17 months of useful data has been collected for this analysis.

14. ACCOMPLISHMENTS OF EXPERIMENT

The Ionospheric Fading Measurements conducted at high latitudes (Churchill) has proved the following:

a) Ionospheric irregulatirites tend to degrade system performance at high latitudes.

b) Fading is known to be frequency dependant and the margin requirement decreses as one approaches L-Band (1550 Mhz) from VHF (254 Mhz) range of frequencies.

c) Maximum Fading occurs during Equinoxes

d) System margin of about 1.5 dB is required for 99.9% propagation reliability for satellite communications at about 1550 Mhz (Churchill).

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

a) Even though statistical analysis gives a fading margin figure of about 115 dB for 99.9% propagation reliability, it is possible to have instantaneous black out of signal lasting for a few seconds during extreme Ionospheric Disturbances due to auroral and magnetic storms which is a common phenomena at high latitudes similar to Churchill Manitoba.

b) The power spectrum analysis show that most of the power is confined to frequency components from DC to 0.4 Hz during quiet ionospheric conditions. During severe ionospheric distrubrances significant power level is present at frequencies greater than 0.6Hz.

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

a) Ionospheric Fading
High Latitude Fading
Scintillations
Fading Margin

b) Power Spectra
Fading Signal Power Spectra
L-Band Power Spectra

SURVEY FORM FOR ATS USERS

1. NAME:
George A. Buck

2. ADDRESS: SEARCH Group, Inc
1620 35th Avenue, Suite 200
Sacramento, California 95822

3. DATE FORM COMPLETED
8/22/75

4. DATE RECEIVED BY UD
9/2/75

5. TITLE OF EXPERIMENT:
Satellite Transmission of Fingerprint Images

6. NAME/DESIGNATION OF SATELLITE ☒ ATS-1 ☐ ATS-3 ☐ ATS-5

Date Started 12/6/71 Date Ended 12/17/71

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☑ d. Data Transmission
- ☐ e. Educational Applications
- ☑ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☒ l. Other Transmission of Fingerprint card facsimile images and video information.

8. OBJECTIVE OF EXPERIMENT:
To determine the technical parameters required for operational utility of a satellite transmission link for rapid fingerprint card transmission, and to provide a background for a more detailed analysis and review of requirements.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
California Crime Technological Research Foundation	4433 Florin Road, Sacramento, California 95823

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Richard Velde	LEAA/U.S. Department of Justice, 633 Indiana Ave., N.W., Washington, D.C. 20531	(202) 376-3985
Paul Wormeli	Public Systems, Inc., 1137 Kern Ave., Sunnyvale, CA 94806	(408) 732-7900
William Reed	Federal Bureau of Investigation, Ninth and Pennsylvania Ave., N.W. Washington, D.C. 20535	(202) 324-3000

OVER

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Project SEARCH Technical Report No. 7, June, 1972, "Satellite Transmission of Fingerprint Images - The Results of a Feasibility Experiment" (We are out of copies. One may possibly be obtained from the Law Enforcement Assistance
b. Administration in Washington, D.C. - if not, we can xerox one if it is necessary.)

c. "Project SEARCH Satellite Communications Experiment" paper from the Proceedings of the International Symposium on Criminal Justice Information and Statistics Systems (copy attached).
d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

See attached article from the Proceedings of the 1972 International Symposium on Criminal Justice Information and Statistics Systems.

13. OVERALL EVALUATION (Check one) Comments

- [x] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

See attached article from the Proceedings of the 1972 International Symposium on Criminal Justice Information and Statistics Systems.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

Satellite
Satellite Transmission
Satellite Communications
Fingerprint
Fingerprint Card
Fingerprint Images
Project SEARCH
SEARCH Group, Inc.
Facsimile
NASA
Video Information
Photographs
Mug Shots
ATS I
California Crime Technological Research Foundation
Law Enforcement Assistance Administration
U.S. Department of Justice

SURVEY FORM FOR ATS USERS

1. NAME: Verner E. Suomi

2. ADDRESS: Space Science & Engineering Center, University of Wisconsin
1225 West Dayton Street
Madison, Wisconsin 53706

3. DATE FORM COMPLETED
29 August 1975

4. DATE RECEIVED BY UD
9/3/75

5. TITLE OF EXPERIMENT:
Spin Scan Cloud Camera

6. NAME/DESIGNATION OF SATELLITE [X] ATS-1 [X] ATS-3 [ ] ATS-5

Date Started ~~June 1965~~ Date Ended ~~May 1974~~

7. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. A/C Communications
- [ ] c. Broadcasting
- [ ] d. Data Transmission
- [ ] e. Educational Applications
- [ ] f. Law Enforcement/ Criminal Justice
- [ ] g. Maritime Traffic Control
- [ ] h. Medical/Health Applications
- [X] i. Meteorology
- [ ] j. Navigation
- [ ] k. Voice Communication
- [ ] l. Other _____

8. OBJECTIVE OF EXPERIMENT:

To study the growth, decay and motions of global cloud systems.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
University of Wisconsin	Madison, Wisconsin
Santa Barbara Research Center	Goleta, California
ATS Project Office	NASA/Goddard Space Flight Center

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a.

Too numerous to include here. Wide utility by meteorological community.

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

Large aperture telescope F 2.5, 10" facial length has 1 mil aperture in focal plane and photomultiplier detector. Telescope tilts as spacecraft spins. Science is scanned E-W due to spacecraft spin, N-S due to telescope tilt with each spin. Signals allow exceedingly accurate reconstruction of the images. These precise images form the basis of a wide variety of meteorological uses.

13. OVERALL EVALUATION (Check one)

- [X] a. EXCEEDINGLY useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

Comments

Tracked storms, hurricanes, global winds from cloud motions. Formed basis of global geostationary satellite system and synch meteorological satellite (SMS)

14. ACCOMPLISHMENTS OF EXPERIMENT

1. Invention of spin scan camera
2. First views of wather in motion
3. Global winds from cloud motions
4. Provided new insight into tropical weather
5. Forms basis of international global weather observing system now being implemented.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

1. Overwhelmingly successful in almost every aspect.
2. Very long lifetime - thus very cost effective
3. Greatest need is in supporting ground equipment to exploit these images and deliver them to users. We underestimated the vast capability.

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

Spin scan cloud camera
geostationary weather satellite
weather in motion
weathersurveillance
cloud winds
global weather system

SURVEY FORM FOR ATS USERS

1. NAME: K. C. Yeh

2. ADDRESS: Department of Electrical Engineering, University of Illinois Urbana, Illinois 61801

3. DATE FORM COMPLETED: August 25, 1975

4. DATE RECEIVED BY UD

012

5. TITLE OF EXPERIMENT:

ATS-6 Radio Beacon Experiment

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☒ ATS-3 ☐ ATS-5 ATS-6

Date Started | Date Ended August 1975

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☒ l. Other Ionosphere

8. OBJECTIVE OF EXPERIMENT:

Ionospheric research with possible applications to satellite-based navigational systems.

9. PARTICIPATING ORGANIZATION | ADDRESS

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Kenneth Davies	SEL/NOAA, Boulder	
John A. Klobuchar	AFCRL, Bedford, MA	

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. D. H. Cowling, H.D. Webb and K.C. Yeh, J. Geophys. Res. 76, 213, 1971

b. J. A. Klobuchar et al., J. Geophysics. Res., 76, 6202, 1971

c. K. C. Yeh, J. Geophys. Res., 77, 709, 1972

d. K.C. Yeh, H. D. Webb and D. H. Cowling, Nature Phys. Sci., 235(59), 131, 1972

e. K. C. Yeh, Space Research XII, 1179, 1972

f. K. C. Yeh, B. J. Flaherty and B.J. Bolfing, Proc. IEEE, 60, 1099, 1972

*Please send copies of the above items as available and others ----------

12. DESCRIPTION OF EXPERIMENT

Measurement, recording, and interpretating the radio beacon data by observing the Faraday polarization effect.

13. OVERALL EVALUATION (Check one)

- [x] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

Comments

In ionospheric research, the continuity of measurement is very important. This was provided by the steady transmission of ATS-3.

14. ACCOMPLISHMENTS OF EXPERIMENT

Provided opportunities to study

(1) Long term ionospheric electron content behavior which was incorporated in a model study for SAMSO.

(2) Ionospheric response to solar flares.

(3) Ionospheric response to magnetic storms.

(4) The behavior of traveling ionospheric disturbances.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

Even though ATS-3 and ATS-5 were not designed specifically for beacon experiments, we have found the signals useful for that purpose.

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

Ionosphere

Faraday Rotation

Electron Content

SURVEY FORM FOR ATS USERS

1. NAME: A. W. Straiton

2. ADDRESS: The Univ. of Tex. at Austin
EE Dept.
ENS 103
Austin, TX 78712

3. DATE FORM COMPLETED: August 29, 1975

4. DATE RECEIVED BY UD: September 5, 1976

013

5. TITLE OF EXPERIMENT:

Propagation of Millimeter Wavelengths Through the Earth's Atmospher - ATS-5

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☐ ATS-3 ☒ ATS-5

Date Started 6/1/67 Date Ended 6/30/72

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☒ l. Other Millimeter Wave Propagation

8. OBJECTIVE OF EXPERIMENT:

Provide information on earth-satellite communication liks at 15.3 and 31.65 GHz.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
Electrical Engineering Research Lab	Rt. 4, Box 189, Austin, TX 78757

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. See attached list.

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

The 15.3 GHz satellite transmissions were observed at Austin, TX over an 18-month interval primarily during periods of rain. Measurements were also made at Mount Locke, near Fort Davis, TX but only for a period of two weeks. Essentially continuous measurements were made in Austin, TX of the sky temperature at 35 GHz looking in the direction of the ATS-5 satellite over an interval of four months. Point-to-point transmissions over the earth's surface at 15 and 35 GHz and various meterological parameters were studied as possible means of predicting performance after a satellite-earth path.

13. OVERALL EVALUATION (Check one) Comments

- ☐ a. Very useful; many benefits
- ☒ b. Useful
- ☐ c. Of some value
- ☐ d. No gain from experiment

Recent publications on results of the University of Texas measurements are listed below:

013

1. Straiton, A. W., et al, Final Technical Report, ATS-5 Millimeter Wave Experiments, Contract NAS 5-10387, "ATS-5 Signal Characteristics at 15.3 GHz and Related Experiments at 15 and 35 GHz," Part I, "Basic Features of the Experiments and Primary Results," June 30, 1972.

2. Pate, David N., A. W. Straiton, and B. M. Fannin, Final Technical Report, ATS-5 Millimeter Wave Experiments, Contract No. NAS 5-10387, "ATS-5 Signal Characteristics at 15.3 GHz and Related Experiments at 15 and 35 GHz," Part II, "Details of the Experiment, Theoretical Background, Observations and Analysis," June 30, 1972.

3. Straiton, A. W., "Statistics on Attenuation at 15 GHz and 31.2 GHz," Abstracts of 1972 Spring URSI Meeting and International G-AP Symposium, April 13-15, 1972, p. 21-22.

4. Straiton, A. W., "Attenuation Probabilities of 15 GHz Radio Waves Over Earth-Satellite Paths," Presented at the XVIIth General Assembly of URSI, Warsaw, Polant, August 1972.

5. Straiton, A. W., D. N. Pate, and B. M. Fannin, "Statistics on Earth-Satellite Attenuation at Two Texas Locations," Presented at the XVIIIth Meeting of Electromagnetic Wave Propagation Panel, NATO-AGARD, September 18-22, 1972, Gausdal Hotel, Norway.

Straiton, A. W., and B. M. Fannin, "Comparison of 15 GHz Propagation Data from the ATS-5 Satellite with Ground Based Radio and Meteorological Data," XVI Symposium on EEP/AGARD, September 1970, Dusseldorf, Germany, pp 10-1 to 10-9.

7. Fannin, B. M., A. W. Straiton, and D. N. Pate, "Effects of Rain on an Earth-Satellite Path at 15 GHz," Millimeter Wave Propagation Experiments Utilizing the ATS-5 Satellite — Papers from the Fall 1970 URSI Meeting, Columbus, Ohio, November 1970, NASA/Goddard Space Flight Center Document X-751-70-428, pp 6-1 to 6-8.

8. Straiton, A. W., C. R. Bailey, and W. Vogel, "Amplitude Variations of 15 GHz Radio Waves Transmitted Through Clear Air and Through Rain," Radio Science, Vol. 5, No. 3, March 1970, pp 551-557.

14. ACCOMPLISHMENTS OF EXPERIMENT

It is concluded that the atmosphere will have no significant effect on 15.3 GHz transmissions at elevation angles $\geq 10^{o}$ in the absence of rain and heavy rain clouds. Attenuations of 5 and 10 dB are exceeded with probabilities of .3% and .12% in Austin, TX. At the Mount Locke site fades $\geq$ 4dB were not experienced. Cloudlights were found to be a useful indicator of the uniformity and duration of fades.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

Rain
Thunderstorms
Attenuation
Sky Temperature
Millimeter Waves
Cloudlight

SURVEY FORM FOR ATS USERS

1. NAME: D. Wayne Hanson	3. DATE FORM COMPLETED September 4, 1975	ϕ14
2. ADDRESS: Time & Frequency Services Section, 277.06, National Bureau of Std's Boulder, Colorado 80302	4. DATE RECEIVED BY UD 10 Sep 75	

5. TITLE OF EXPERIMENT:
Time and Frequency Broadcasting

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☒ ATS-3 ☐ ATS-5

Date Started August 1971 | Date Ended August 1973

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☒ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☐ l. Other Time & Frequency broadcasting

8. OBJECTIVE OF EXPERIMENT:
Explore the advantages and problems of broadcasting time and frequency signals from geostationary satellites

9. PARTICIPATING ORGANIZATION | ADDRESS

National Bureau of Standards	Boulder, Colorado 80302

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date) 0047

a. D. W. Hanson and W. F. Hamilton, "Time and Frequency Broadcast Experiments from the ATS-3 Satellite," NBS Technical Note 645, November 1973.

b. D. W. Hanson and W. F. Hamilton, "Satellite Broadcasting of WWV Signals," IEEE Transactions on Aerospace and Electronic Systems, pp. 562-573, Vol. AES-10, No. 5, September 1974.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

Transmit from Boulder, Colorado, to ATS-3 time and frequency signals including voice, tones, ticks, and time codes. Receive and evaluate signals at 4 or 5 locations in North and South America which have access to microsecond timing. Evaluate antennas, receivers, reception techniques, and accuracy. Solicit public participation in experiment to evaluate usefulness and public acceptance to satellite broadcasted signals.

13. OVERALL EVALUATION (Check one) Comments

- [X] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT This experiment revealed many of the potentials of and problem areas associated with the broadcasting of time and frequency information from geostationary satellites. A broadcast format very similar to the WWV format was used with effectiveness. Specifically, the experiment demonstrated the superiority and suitability of satellite broadcasts through the following areas: 1. Using a moderate receiving bandwidth and power, a potential accuracy of 10 μs or better was indicated and, in some periods of the experiment, achieved. 2. The signals were highly reliable in that they were available to 40% of the earth's surface without interruption due to fading or other propagation anomalies. This implied a continuous uninterrupted performance to the full coverage area of a permanent service. 3. The cost of user equipment was inexpensive and not substantially different from the equipment required for the reception of the NBS stations WWV and WWVH. 4. To relaize the high-accuracy timing potential, only very simple delay caluclations were required and were readily satisfied by a simple and inexpensive circular slide rule. 5. Considerable interest exists in the time and frequency community for a satellite service as evidenced by the over 9000 inquiries about the experiment. 6. The time recovery techniques were basically identical to those used with WWV or WWVH except that greater path predictability and higher sampling rates enhanced the user's ability for time recovery and reduced his involvement to obtain the highest accuracy. 7. The signal quality was in every respect superior to the WWV/WWVH broadcasts and resulted in a clearer voice channel.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)
Satellites could easily satisfy the growing needs of the nation for a higher quality, more reliable, and more flexible time and frequency information source. The availability of satellite-relayed time and frequency information would expand the applications for these signals. The high signal-to-noise ratios and freedom from fading would lend themselves to automatic equipment uses. Applications can be projected in the power industry where timing signals are required for fault monitoring and power system regulation. Airports, environmental, and geophysical monitoring sites also require automatic recording of time in parallel with the recording of designated events. The time and frequency needs in the transportation industry are growing beyond the capabilities of present systems to serve them. Areas include vehicle location, vehicle surveillance, traffic management, and collision avoidance. Digital communications systems are moving to higher data rates requiring increased synchronization capability. All these mentioned applications and many more can benefit directly from a reliable satellite time and frequency service.

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

Broadcasting, Dissemination, Frequency, Satellite, Synchronization, Time

SURVEY FORM FOR ATS USERS

1. NAME: J. Kinik	3. DATE FORM COMPLETED: August 29, 1975	015
2. ADDRESS: Telesat Canada 333 River Road Ottawa, Ontario, Canada K1M 2B6	4. DATE RECEIVED BY UD: September 10, 1975	

5. TITLE OF EXPERIMENT:

Antenna Gain and Pattern Measurement

6. NAME/DESIGNATION OF SATELLITE ☒ ATS-1 ☐ ATS-3 ☐ ATS-5

Date Started: September 25, 1972 | Date Ended: September 29, 1972

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☒ l. Other Communications Test to Establish Antenna RF Characteristics

8. OBJECTIVE OF EXPERIMENT:

To measure gain and patterns of two large communications antennas.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
RCA Ltd.	St. Anne De Bellevue, Quebec, Canada

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
P. Foldes	RCA Ldt.	
	St. Anne De Bellvue,	
	Quebec, Canada	

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Preliminary Report on Gain and Pattern Measurements Made Through ATS-1 Satellite Using the Telesat Heavy-Route Antennas at Allan Park (Ontario) and Lake Cowichan (British Columbia).

b. Prepared for Telesat by RCA Ltd. - Project 2207-1

c.

d.

e.

f.

*Please send copies of the above items as available - none available at Telesat

12. DESCRIPTION OF EXPERIMENT

Transmit gain tests were performed on the two antennas by comparison with a signal transmitted from a third calibrated antenna in the Telesat system (at Allan Park, co-located with one of the antennas under test). Transmit pattern tests were performed by transmitting a signal from the antenna under test and scanning the satellite. The received signal from the standard calibrated antenna was recorded to provide the pattern data.

13. OVERALL EVALUATION (Check one) Comments

- ☐ a. Very useful; many benefits
- ☐ b. Useful
- ☒ c. Of some value
- ☐ d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

Preliminary indication obtained of RF characteristics of two primary antennas in Telesat Canada's earth station network. This allowed Telesat to enter into the testing phase of its completed system after its own satellite was launched into synchronous orbit in November 1972.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

- Test was useful in providing some preliminary data on the antennas RF performance.
- Limitations were the short amount of time the satellite was available for tests as well as the limited frequencies at which tests could be performed on the satellite.

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

Antenna
Gain
Pattern
Test

SURVEY FORM FOR ATS USERS

1. NAME: Dr. Walter Goebel

2. ADDRESS: Deutsche Forschungs- und Versuchsanstalt fur Luft- und Raumfahrt
Forschungszentrum, 8031 Oberpfaffenhofen

3. DATE FORM COMPLETED

4. DATE RECEIVED BY UD

016

5. TITLE OF EXPERIMENT: Experimente Mit Dem Satelliten

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☒ ATS-3 ☐ ATS-5

Date Started May 1968 | Date Ended December 1969

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☑ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☒ j. Navigation
- ☒ k. Voice Communication
- ☐ l. Other ~~Propagation Experiments~~ Antennas

8. OBJECTIVE OF EXPERIMENT:

test of several antenna configurations
test of small signal processing
test of antenna diversity system
test of tone ranging
test of voice communication
test of remote controlled data transmission

9. PARTICIPATING ORGANIZATION — ADDRESS

Deutsches Hydrographisches Institut	2 Hamburg, Bernhard Nochtstr. 78
Max Planck Institut fur Aeronomie	3411 Lindau/Harz, Postfach 20
Bundespost, Funkamt Hamburg	2 Hamburg 13, Rothenbaumchaussee 116
Fa. OEBEG	2 Hamburg 11, Katharinenstr. 23-25

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Dr. Hartmann	Max Planck Institut fur Aeronomie 3411 Lindau/Harz	05556/411

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. I - Experimente Mit Dem Satelliten ATS-3 Im Himblick auf Spatere Nutzung Eines Navigations Satelliten in Der Schiffahrt (FB W 69-37-no translation available)

b. II - Verwendung Einfacher Omnidirektionaler Ukw-Antennen Auf Schiffen fur den Satelliten E-pfang Unter Asschaitung d. Nebeneffektmittels Eines Divirsity

c. Systems. (FB 71-05-Translation by Royal Aircraft Establishment)

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

Experiment I: On research vessel METEOR two campaigns were conducted in 1968: a) West Africa (near Senegal, Gambia, Mauretania)
b) Iceland-Faeroer-Islands
VHF-equipment was installed on METEOR with a number of low gain antennas, computer for bit error calculation, teletype, tone-ranging. All experiments were conducted in closed loop METEOR-ATS-3-METEOR. Voice contact for an experimental schedule was conducted with ROSMAN and MOJAWE.

Experiment II: On the building of the research center Oberpfaffenhofen a couple of VHF low gain antennas were installed to realize an antenna diversity system. Experiments were conducted with voice communications, tone ranging and propagation effects with different surface conditions (dry, rain, snow). Again the tests were made in closed loop.

13. OVERALL EVALUATION (Check one)

- [x] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

Comments

The schedule worked excellently, the satellite transponder was operating without failures.

14. ACCOMPLISHMENTS OF EXPERIMENT

Experiment I : As a result of the tests there was a good chance to have a full maritime service with a low cost station of about 6dB gaim using VHF frequencies. However in 1971 the frequency allocation was fixed between 1535-1660 MHz at WARC.

Experiment II : As a result of the tests a method could be defued to improve satellite signals received by omnidirectional antennas by 6 dB max. and to exclude fadings at all. This method was described in later years by William Lee and Yu Yeh in IEEE Transactions on communications Vol. Com-20, No 5, October 1972.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

The ATS-3 satellite gave a very good opportunity to conduct experiments for maritime purposes on a ship. The cooperation with NASA and the both tracking stations ROSMAN and MOJAWE was excellent. However the frequencies have changed by international agreement, thus the accomplishments cannot be used for the Maritime-Satellite-System of teh future, therefore new experiments with ATS-6 had to be conducted

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

Maritime communications
Antenna Diversity System
Tone ranging
MARSAT

SURVEY FORM FOR ATS USERS

1. NAME: Paul K. Wormeli

2. ADDRESS: Public Systems Inc.
1137 Kern Avenue
Sunnyvale, CA 94086

3. DATE FORM COMPLETED: 9/25/75

4. DATE RECEIVED BY UD

017

5. TITLE OF EXPERIMENT:
Satellite Transmission of Fingerprint Images - A Feasibility Study

6. NAME/DESIGNATION OF SATELLITE [x] ATS-1 [ ] ATS-3 [ ] ATS-5

Date Started 12/6/71 Date Ended 12/17/71

7. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. A/C Communications
- [ ] c. Broadcasting
- [x] d. Data Transmission -
- [ ] e. Educational Applications
- [ ] f. Law Enforcement/ Criminal Justice
- [ ] g. Maritime Traffic Control
- [ ] h. Medical/Health Applications
- [ ] i. Meteorology
- [ ] j. Navigation
- [ ] k. Voice Communication
- [ ] l. Other _____

8. OBJECTIVE OF EXPERIMENT:
1. Demonstrate feasibility of using a satellite to transmit high resolution fingerprint data.
2. Obtain data on system parameters affecting operational performance.
3. Obtain data on technical and economic feasibility of the total operation system including the satellite component.

9. PARTICIPATING ORGANIZATION — ADDRESS

See attached

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Ronald Bykowski	700 Cass St., Monterey, CA 93940	408/373-2961
Robert L. Ward	1077 Ticonderoga Dr., Sunnyvale, CA 94087	408/245-9441

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Project SEARCH Technology Committee, Subcommittee on Feasibility of Satellite Communications, "Satellite Transmission of Fingerprint Images - The Results of a Feasibility Experiment", Technical Report No. 7, June 1972.

b.

For copy, contact SEARCH Group Inc.
1620 - 35th Avenue
c. Suite 200
Sacramento, CA 95822
(916) 392-2550

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

See attached

13. OVERALL EVALUATION (Check one) Comments

- ☐ a. Very useful; many benefits
- ☒ b. Useful
- ☐ c. Of some value
- ☐ d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

Established the technical feasibility of a national satellite-based communications system for the high-speed transmission of fingerprint images, other documents and various other data.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

Fingerprint
Fingerprint Transmission
Facsimile Transmission
Satellite Communication
Law Enforcement Communications
Fingerprint Transmission System

SURVEY FORM FOR ATS USERS

1. NAME: Roy H. Blackmer, Jr.

2. ADDRESS: Stanford Research Institute
333 Ravenswood Avenue
Menlo Park
California 94025

3. DATE FORM COMPLETED
9-10-75

4. DATE RECEIVED BY UD
12 Sep 75

ϕ18

5. TITLE OF EXPERIMENT:

See enclosures

6. NAME/DESIGNATION OF SATELLITE [X] ATS-1 [X] ATS-3 [ ] ATS-5

Date Started	Date Ended

7. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. A/C Communications
- [ ] c. Broadcasting
- [ ] d. Data Transmission
- [ ] e. Educational Applications
- [ ] f. Law Enforcement/ Criminal Justice
- [ ] g. Maritime Traffic Control
- [ ] h. Medical/Health Applications
- [XX] i. Meteorology
- [ ] j. Navigation
- [ ] k. Voice Communication
- [ ] l. Other _____

8. OBJECTIVE OF EXPERIMENT:

Extract Meteorological Information from Motion and Changes in Cloud Cover

9. PARTICIPATING ORGANIZATION ADDRESS

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a.

b.

c.

SEE ENCLOSURES

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

SEE ENCLOSURES

13. OVERALL EVALUATION (Check one) Comments

- [X] a. Very useful; many benefits — Couldn't have made studies w/o ATS Data
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

SEE ENCLOSURES

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

SEE ENCLOSURES

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

SURVEY FORM FOR ATS USERS

1. NAME: AII SYSTEMS

2. ADDRESS: 344 New Albany Road, Moorestown, N.J. 08057

3. DATE FORM COMPLETED: September 5, 1975

4. DATE RECEIVED BY UD: 17 Sep 75

$19

5. TITLE OF EXPERIMENT: L-Band ATS-5-ORION - S. S. Manhattan Marine Navigation and Communication Experiment

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☐ ATS-3 ☒ ATS-5

Date Started 4-3-70 | Date Ended 4-24-70

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☒ j. Navigation
- ☐ k. Voice Communication
- ☐ l. Other _____

8. OBJECTIVE OF EXPERIMENT: To conduct a series of navigation and communications experiments on an ocean craft via the ATS-5 spacecraft over wide variations in latitude, longitude, elevation angle, and weather conditions, to provide the basis for demonstrating the feasibility of navigation and traffic control services via synchronous satellites, by correlation of the measured quantitative data with the theoretical expectations.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
NASA Electronic Research Center	Cambridge, Mass.
NASA STADAN Station	Mojave, California
EXXON Marine Division	

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number, or journal citation, date)

a. O.J. Hanas, et al: Final Report, L-band ATS-5 - ORION - S.S. Manhattan Marine Navigation and Communication Experiment; Contract No. NAS 12-2260, June 1970.

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

A unique experiment took place during the S.S. Manhattan's Spring 1970 Arctic Voyage in which L-band signals relayed by synchronous satellite were successfully used for navigation and data communication for the first time. RF signals containing ranging modulation were transmitted from NASA's STADAN Station at Mojave, California, relayed through the ATS-5 synchronous satellite and received by two stations. One was stationary, located at the AII SYSTEMS laboratory in Moorestown, New Jersey, and the other was marine mobile, installed on the EXXON icebreaking tanker, S.S. Manhattan. This experiment demonstrated to a precision never before achieved the feasibility of position fixing by making range measurements between a fixed ground station, a satellite in a known position and a moving platform on the surface of the Earth. Also notable in this experiment was the simultaneous transmission and reception of data communications on the ranging signal.

13. OVERALL EVALUATION (Check one) Comments

- [x] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

Three general conclusions resulting from this experiment are presented below:

a. L-band signal transmission via a synchronous satellite can produce precise and stable range measurements which are the foundation for precision navigation systems of the future.

b. The ATS-5 synchronous satellite, although presently in a spinning mode, fulfills all essential requirements for feasibility experimentation to prove concepts involved in L-band position fixing experiments. Additionally, data relaying concepts can also be demonstrated and evaluated.

c. The relative simplicity of the equipment involved in this experiment leads to the conclusion that an uncomplicated equipment complement involving simple procedures is possible for widespread marine use in the future. This passive navigation system will provide instantaneous position fixing across broad areas of the globe at relatively low cost for each user.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

A peculiar constraint was imposed on this system by virtue of the spinning of the satellite. ATS-5 was rotating at 76 rpm with its directional antenna sweeping the Earth with each rotation; unique receiving circuitry was thereby required to lock up and produce range measurements. The sweeping antenna pattern modulates signals transmitted to and from the satellite. The main lobe occurs for about 5% of the scan time, and for the remainder of the scan the signal is essentially nulled.

The successful accomplishment of receiving ranging signals under these conditions was made possible by the use of the ORION receiver. This receiver makes extensive use of digital tracking techniques to provide stable holding of the range measurements between samples of received signal fromthe spinning ATS-5 satellite. These digital techniques, together with proportional error correction in the loop, assures rapid lock-up, made necessary by the burst transmission from the spinning spacecraft.

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

L-Band Maritime Satellite Communications/Navigation

SURVEY FORM FOR ATS USERS

1. NAME: AII SYSTEMS

2. ADDRESS: 344 New Albany Road
Moorestown, N.J. 08057

3. DATE FORM COMPLETED
September 5, 1975

4. DATE RECEIVED BY UD
17 Sep 75

020

5. TITLE OF EXPERIMENT: System 621B/ATS-5 Signal Demonstration Test

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☐ ATS-3 ☒ ATS-5

Date Started October 1970 | Date Ended January 1971

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☒ l. Other Evaluation of ionospheric propagation effects at L-band frequencies.

8. OBJECTIVE OF EXPERIMENT:

The program achieved the two primary objectives established in the contract work statement:

- To demonstrate the ability of System 621B receiver equipment to provide accurate and precise ranging data.
- To evaluate ionospheric propagation delay for L-band signals using NASA's Application Technology Satellite (ATS-5) On-Orbit

9. PARTICIPATING ORGANIZATION | ADDRESS

U.S.A.F. Space and Missile Systems Organization (SAMSO). | Los Angeles, California

NASA Office of Space Sciences and Applications.

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. J.D. Barnla, et al: System 621B/ATS-5 Signal Demonstration Test; SAMSO TR71-35, 26 February 1971. (ϕ39)

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

The ATS-5 synchronous satellite, which is spinning, produces a return signal beam which sweeps across the Earth every 783 milliseconds. A signal reception window of approximately 50 milliseconds is available with each rotation. As a consequence of the satellite motion the L-band and C-band ranging data was required near simultaneously. To accomplish this the receiver continuously reacquired the satellite signal within a few milliseconds at the beginning of the burst and obtained ranging data at both L-band and C-band within the burst. The L-band ionospheric propagation delay variation was evaluated by comparing L-band and C-band range measurements.

13. OVERALL EVALUATION (Check one) Comments

- [x] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

A receiver integrally connected with a computer-controlled data collection system has been developed and demonstrated over the three-month testing period. This receiver system is capable by means of maximum length PRN code modulation of producing fine grain L-band and C-band range measurements to the spinning ATS-5 during each illumination burst. The performance characteristics enabled these measurements to be made under these burst conditions and with small doppler components present.

The L-band ionospheric propagation delay data has been derived from range measurements made over several 24-hour test periods. The points produce a trend which shows how atmospheric delay varies as a function of local time. From the minimum in early morning to the maximum at mid-day, an equivalent range variation of 25 feet is indicated.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

The results of the signal demonstration tests conducted for this program have, based upon assessments made by Air Force personnel, made a major contribution to System 621B.

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

Measurement of Ionospheric Propagation delay at L-band.

SURVEY FORM FOR ATS USERS

1. NAME: AII SYSTEMS	3. DATE FORM COMPLETED: September 5, 1975	ϕ21
2. ADDRESS: 344 New Albany Road, Moorestown, N.J. 08057	4. DATE RECEIVED BY UD: 17 Sep 75	

5. TITLE OF EXPERIMENT:
Marine Data Communications Demonstration Test Program

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☐ ATS-3 ☒ ATS-5

Date Started February 21, 1971 | Date Ended March 10, 1971

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☑ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☐ l. Other _____

8. OBJECTIVE OF EXPERIMENT: The program achieved the four objectives established in the contract Work Statement: 1) Demonstration of two-way data communications employing simple and practical shipboard terminal equipment; 2) Demonstration of the feasibility of using L-band transmission for this type of communications; 3) Demonstration of the use of a data compression technique; 4) Demonstration of a satisfactory data rate with an acceptable error rate for this type system.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
U.S. Maritime Administration	
NASA STADAN Station	Mojave, California

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Final Report, Vol. II: Marine Data Communications Demonstration Test Program; Contract #1-35057, June 15, 1971

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

The following summarizes the major efforts and the tasks and events which comprised the program:

The four-month phase of receiver modification, transmitter development and data buffer design constituted the development and fabrication effort. Laboratory and field testing and evaluation of this equipment was heralded by a milestone transmission on January 7, 1971. This marked the first time signals from a low-power terminal were transmitted to the Mojave Station via the ATS-5 satellite. Further equipment test and checkout led to the installation of the shipboard equipment on-board the ESSO BALTIMORE on February 21, 1971.

Two-way data communications testing was then conducted between the shipboard terminal and the receiver installation at Mojave STADAN until the test run was completed on March 10, 1971. Typical test periods consisted of two-way data transmission between the shipboard terminal equipment and the ground station equipment. Tests were conducted from the ESSO BALTIMORE while she made the round trip voyage from Bayway, New Jersey, to Baytown, Texas.

13. OVERALL EVALUATION (Check one) Comments

- [x] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

This experimental program demonstrated that L-band satellite digital data communications are feasible, cost effective and practical in a typical marine environment. The experimental test proved that small antennas and compact low-power transmitters can be used with available terminal equipment, such as teletypewriters, to provide data communications services via existing satellites.

The test program proved the technical feasibility of burst type of data transmission and provided pertinent test data to ascertain the error rates and the equipment requirements for a fixed shore station and a mobile marine communications terminal.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

The spinning satellite constraint necessitated the development of a data buffer which would serve to accumulate teletype words in a simple memory and then repeat this group of words a sufficient number of times to insure interception of the satellite illumination window. However, the test results effectively show that the basic system configuration, operating at L-band frequencies, holds great promise for future marine communications and data services. The availability of L-band communications system hardware provides a baseline configuration offering the advantages of simplicity, reliability and economy. The demonstrated reliability of the L-band communications link at high data rates under all environmental conditions satisfies the objective of providing reliable worldwide communications capability for the maritime user.

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

Maritime SAtellite Communications Test Demonstration.

SURVEY FORM FOR ATS USERS

1. NAME: AII SYSTEMS

2. ADDRESS: 344 New Albany Road
Moorestown, N.J. 08057

3. DATE FORM COMPLETED
September 5, 1975

4. DATE RECEIVED BY UD
17 Sep 75

022

5. TITLE OF EXPERIMENT: Study of Precise Positioning at L-band Using Communications Satellites

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☐ ATS-3 ☒ ATS-5

Date Started July 7, 1971 | Date Ended July 30, 1971

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☒ j. Navigation
- ☐ k. Voice Communication
- ☐ l. Other _____

8. OBJECTIVE OF EXPERIMENT:
The program objectives established in the work statement were to demonstrate:
- Level of resolution
- Repeatability
- Precision, and
- Accuracy

of existing modest-cost effective navigation equipment.

9. PARTICIPATING ORGANIZATION | ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
NASA-Wallops Station	Wallops Island, Va.

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Final Report: Study of Precise Positioning at L-Band Using Communications Satellites; Contract No. NAS6-1962, October 27, 1971.

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

The experiment configuration and data reduction techniques were developed in parallel with the hardware modification tasks. In the hardware modification phase, two existing AII SYSTEMS L-band receiving systems were specifically revised for the test and then calibrated by operating with the AII SYSTEMS modulator; also, a tape control unit was developed for interfacing the receivers with a magnetic tape drive for data recording.

A PN code modulator was installed at the NASA STADAN Station at Rosman, North Carolina, to provide the ranging signal for transponding by the ATS-5 satellite.

After the installation of the receiving systems at the NASA Wallops facilities, three weeks of testing were conducted to evaluate the equipment precision and determine the accuracy of relative position fixing. The initial data reduction was accomplished in near-real-time using the NASA computer facilities at Wallops Station.

13. OVERALL EVALUATION (Check one) Comments

- [X] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

The following conclusions are warranted by the results of the study and experiment:

- Communications satellites in synchronous orbit can be utilized as transponders for relay of precision positioning signals.
- Using those signals at L-band, positioning accuracies relative to another receiver of less than 30 feet are achievable even without accurate ephemeris data and on a moving ship. With an integration period of an hour or more, relative positioning accuracies of 8 feet are achievable.
- The major source of errors encountered appears to be the rubidium frequency standard.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

This work was performed under NASA Contract No. NAS6-1962 by AII SYSTEMS using unique proprietary equipment. During the course of this effort the applications of precision position fixing became increasingly apparent to the individuals involved in the program. Requirements for position fixing with accuracies of less than 50 feet have been expressed by all three Armed Services, the Coast Guard, the Maritime Administration, the Federal Aviation Administration, the National Oceanic and Atmospheric Agency, and the Department of the Interior.

The test results verify the ability of a satellite-based system to satisfy the requirements of precision position fixing. The potential for serving the user needs through employment of communications satellites in synchronous orbit and low-cost ground terminal receiving equipment is most attractive.

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

Precision Positioning (Navigation) Using Synchronous Communications Satellites.

SURVEY FORM FOR ATS USERS

1. NAME: AII SYSTEMS

2. ADDRESS: 344 New Albany Road
Moorestown, New Jersey
08057

3. DATE FORM COMPLETED
September 5, 1975

4. DATE RECEIVED BY UD
17 Sep 75

#23

5. TITLE OF EXPERIMENT: Maritime Satellite Navigation/Communication Program

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☒ ATS-3 ☐ ATS-5

Date Started March, 1973 | Date Ended August 1973

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☒ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☒ j. Navigation
- ☐ k. Voice Communication
- ☐ l. Other _____

8. OBJECTIVE OF EXPERIMENT:

The fundamental purpose of the MARSCAN System was to provide two-way data communications between selected ships and their respective operating organizations via synchronous satellite.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
U.S. Maritime Administration	Washington, D.C.
~~National Maritime Re~~search Center	Kings Point, N.Y.
NASA STADAN Station	Rosman, North Carolina

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Final Report: Volume I Maritime Satellite Navigation/Communication Program MA-RD-900-74030, November 15, 1973

b. Final Report: Volume II Maritime Satellite Navigation/Communication Program; MA-RD-900-74022, November 15, 1973

c. Final Report: Volume III Maritime Satellite Navigation/Communication Program; MA-RD-900-74032, November 15, 1973

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

In addition to providing two-way data communications between selected ships and their operating organizations, by using a second suitably located satellite, position-determination information in a surveillance mode would be provided. The implementation of these two fundamental operations established the foundation upon which pseudo-operational experiments could be designed and conducted. These included the routine transmission of daily noon reports, engine-room log data, spares provisioning, payroll preparation, simulated emergencies, weather dissemination, and other traffic-management functions.

13. OVERALL EVALUATION (Check one) Comments

- [x] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

During the six-month experiment period an aggregate of 1,000 ship-days were accumulated on which terminals were present on the snips. Since this included weekends and other days during which satellites were not available and/or ship operations were not possible, approximately one-half of this time were days when the ship operation was possible within the satellite coverage area and coincident with available satellite time. Communications were accomplished during nearly 300 of the available ship terminal operational days, and over 5,000 communications messages between the ship terminal and the Maritime Coordination Center were accomplished, involving almost one million characters. Although the amount of time available on the ATS-3 was limited, over one hundred position determination measurements were made. Many more ranging measurements were made using the primary ATS-5 satellite.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

The above figures point up several significant differences between this experiment and future operational conditions. The employment of C-band transmission placed restriction on the ship terminals transmitting in most ports and along the coastal areas of the United States. In addition, terrestrial C-band interface was frequently encountered in ports and along coastal regions. A second factor was availability of satellite time of approximately forty hours per week, restricting the use to eight hours for each of five days and requiring initialization periods for each day's start-up. A third factor involved the location of the ship terminal aboard the ship; since the experiment was for a limited period, the temporary location of the antenna generally was not one in which an unrestricted view of the satellite could be obtained under all conditions. Occasional physical blockage by the ship's superstructure occurred, and this was necessarily disruptive of continuous operation.

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

Maritime Satellite Communications/Navigation Experiments.

SURVEY FORM FOR ATS USERS

1. NAME: AII SYSTEMS

2. ADDRESS: 344 New Albany Road
Moorestown, N.J. 08057

3. DATE FORM COMPLETED
September 5, 1975

4. DATE RECEIVED BY UD
17 Sep 75

¢24

5. TITLE OF EXPERIMENT: Maritime Satellite Navigation/Communication Experiment System

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☐ ATS-3 ☒ ATS-5 , ATS-6

Date Started August 1, 1974 | Date Ended April 18, 1975

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☒ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☒ j. Navigation
- ☒ k. Voice Communication
- ☐ l. Other _____

8. OBJECTIVE OF EXPERIMENT: The MarAd Experimental System consisting of shore-based and ship terminal subsystems, provides, in conjunction with the ATS-5 and ATS-F synchronous equatorial satellites, a test vehicle for the conduct of two-way communications, voice and data tests, between the shore-side and the ships within the ATS-F coverage area. In addition, the configuration provides the capability of conducting ship position determination experiments.

9. PARTICIPATING ORGANIZATION | ADDRESS

U.S. Maritime Administration	Washington, D.C.
National Maritime Research Center	Kings Point, New York
NASA STADAN Station	Rosman, North Carolina

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Preliminary Data Reduction Summary Report for Maritime Satellite Navigation/Communication Experiment System; MAR-594-R-025, August 8, 1975.

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT The shore-based facilities included Kings Point Earth Station and the Maritime Coordination Center located at the National Maritime Research Center, Kings Point, New York. In addition, a small C-band transmitting facility located at the NASA STADAN station, Rosman, North Carolina, will be available to support the position determination experiments involving the ATS-5 satellite.

The shipboard satellite terminal communications equipment consists of an L-band transmitter, receiver and antenna subsystem capable of supporting full-duplex voice, data and ranging communications. This fundamental configuration supports various experimental operations: A computer-controlled automatic operational mode will support ranging (position determination), data or voice experimentation when utilizing the integrated ranging/voice/data modem. This modem and a series of software tasks provide an automatic configuration for the exchange of data communications messages between the ships and their respective shipping company offices, as well as the Maritime Coordination Center. Ranging and/or position determination experiments and voice communications experiments can be conducted simultaneously if desired.

13. OVERALL EVALUATION (Check one) Comments

- [x] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT: Test data were accumulated for 93 test periods which were conducted from August 1, 1974, to April 18, 1975. The total operating time was 407 hours consisting of 277 hours of useful time and 130 hours of lost time due to system outages or operational problems. Further test subdivisions of interest are as follows:

Formal Test Type
AII SYSTEMS Navigation
AII SYSTEMS Voice Modem
AII SYSTEMS Ranging/Data Modem
Magnavox Voice Modem
Magnavox Data Modem
COMSAT Data and Voice Modems
Fleet Management
Miscellaneous

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

Maritime Satellite Navigation/Communications Experiments Employing ATS-F.

SURVEY FORM FOR ATS USERS

1. NAME: R. W. Granville

2. ADDRESS: Federal Aviation Administration
Trans Point Building ARD-232
2100 2nd Street, S.W.
Washington, D.C. 20590

3. DATE FORM COMPLETED: September 2, 1975

4. DATE RECEIVED BY UD: September 17, 1975

025

5. TITLE OF EXPERIMENT:
ATS-5 Multipath/Ranging/Digital Data L-Band Experimental Program

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☐ ATS-3 ☒ ATS-5

Date Started May 1971 Date Ended March 1973

7. SUBJECT CATEGORY OF EXPERIMENT

- ☒ a. Air Traffic Control
- ☒ b. A/C Communications
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☐ l. Other _____

8. OBJECTIVE OF EXPERIMENT:

To acquire data within the 1545 to 1655 MHz frequency band. Tests included over land and overocean multipath measurements, one way tone ranging, evaluation of digital data communication performance, and nighttime equatorial signal strength scintillation measurements.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
National Aviation Facilities	Pomona, New Jersey
Experimental Center	
Boeing Commercial Airplane Co.	P. O. Box 3707
	Seattle, Washington 98124

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
F. W. Jefferson	National Aviation Experiment Center	(609)641-8200
	Pomona, New Jersey	Ext. 3907
R. W. Sutton	Boeing, Seattle, Washington	(206)655-9692
F.S. Carr	Federal Aviation Administration	(202)426-8496
	Trans Point Building, Washington, D.C.	

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. R. W. Sutton et al., ATS-5 Multipath/Ranging/Digital Data L-Band Experimental Program, FAA-RD-73-57, April 1973 (0288)

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

Tests involved an FAA KC-135 jet aircraft, The NASA ATS-5 satellite, the NASA/Rosman ground station, and the FAA NAFEC facility. Nearly all tests used a link configuration consisting of a transmitting station at Rosman, a receiving terminal onboard the test aircraft, and the CXL translation mode of ATS-5. Tests included 30 overocean multipath and ranging flights in the North Atlantic Region, 16 digital data communication tests, eight overland multipath flights including both summer and winter conditions, six overocean multipath flights in the Pacific Region, and nine fixed-link scintillation tests.

13. OVERALL EVALUATION (Check one) Comments

- [x] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

See Report FAA-RD-73-57 (0288)

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

L-Band
Multipath
Tone Ranging
Data Communication
Scintillation
Scatter Model

SURVEY FORM FOR ATS USERS

1. NAME: R. W. Granville

2. ADDRESS: Federal Aviation Administration
Trans Point Building ARD-232
2100 2nd Street, S.W.
Washington, D.C. 20590

3. DATE FORM COMPLETED: September 2, 1975

4. DATE RECEIVED BY UD: September 17, 1975

026

5. TITLE OF EXPERIMENT:

Characteristic Data of VHF Communications Link Via Satellite

6. NAME/DESIGNATION OF SATELLITE ☒ ATS-1 ☐ ATS-3 ☐ ATS-5

Date Started 1967 Date Ended 1968

7. SUBJECT CATEGORY OF EXPERIMENT

- ☒ a. Air Traffic Control
- ☒ b. A/C Communications
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☒ k. Voice Communication
- ☐ l. Other [illegible]

8. OBJECTIVE OF EXPERIMENT:

To obtain characteristic data of a VHF communications link. This included collection of multipath, error rate data. In addition, an evaluation was made for an FAA phased array antenna.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
National Aviation Facilities Experimental Center (NAFEC)	Pomona, New Jersey

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Francis W. Jefferson	National Aviation Facilities Exp. Ctr. Pomona, New Jersey	(609)641-8200 Ext. 3907

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. F. W. Jefferson, Characteristic Data of VHF Communications Link Via Satellite, FAA-RD-70-12, June 1970 (028J)

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

Tests involved the use of the FAA KC-135 jet aircraft with the NASA ATS-1 satellite. Flight tests were made in the Atlantic Region, to Alaska, down to the sub-satellite point and returning across southwest United States to New Jersey. Data was collected to determine effects of multipath and adjacent channel interference. Using data communications, bit error rates were determined for teletype, 1200 and 2400 bit/sec data rates.

13. OVERALL EVALUATION (Check one) Comments

- [x] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

See Report FAA-RD-70-12 (0289)

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

SURVEY FORM FOR ATS USERS

1. NAME: R. W. Granville

2. ADDRESS: Federal Aviation Administration
Trans Point Building, ARD-232
2100 2nd Street, S.W.
Washington, D.C. 20590

3. DATE FORM COMPLETED: September 2, 1975

4. DATE RECEIVED BY UD: September 17, 1976

027

5. TITLE OF EXPERIMENT:

VHF Ranging and Position Fixing Experiment Using ATS Satellites

6. NAME/DESIGNATION OF SATELLITE [X] ATS-1 [X] ATS-3 [ ] ATS-5

Date Started November 1968 | Date Ended October 1969

7. SUBJECT CATEGORY OF EXPERIMENT

- [X] a. Air Traffic Control
- [ ] b. A/C Communications
- [ ] c. Broadcasting
- [ ] d. Data Transmission
- [ ] e. Educational Applications
- [ ] f. Law Enforcement/ Criminal Justice
- [ ] g. Maritime Traffic Control
- [ ] h. Medical/Health Applications
- [ ] i. Meteorology
- [ ] j. Navigation
- [ ] k. Voice Communication
- [ ] l. Other _____

8. OBJECTIVE OF EXPERIMENT:

To determine performance accuracy of tone ranging in conjunction with ground reference transponders for position fixing of a mobile.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
National Aviation Facilities Experimental Center	Pomona, New Jersey
NASA-GSFC	Greenbelt, Maryland
General Electric	Schenectady, New York

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
E. W. Jefferson	National Aviation Experimental Center, Pomona, New Jersey	(609)641-8200 Ext. 3907
J. P. Corrigan	NASA-GSFC, Greenbelt, Maryland	(301)982-4095
Roy E. Anderson	General Electric, Schenectady, New York	

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. VHF Ranging and Position Fixing Experiment Using ATS Satellites S-70-1003 (General Electric Document)

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

This was a joint effort between FAA, NASA and General Electric. The tests involved an FAA KC-135 jet aircraft, the NASA ATS-1 and ATS-3 satellites with data collection at the General Electric Ground Station at Schenectady, New York. Tone ranging techniques were used for position fixing of the aircraft.

13. OVERALL EVALUATION (Check one) Comments

- ☐ a. Very useful; many benefits
- ☒ b. Useful
- ☐ c. Of some value
- ☐ d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

Ground reference transponders at spacings of hundreds of nautical miles are useful in improving position fixing accuracy of a mobile, and that one nautical mile, one sigma accuracy may be achieved when they are employed.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

Satellite Ranging
Tone Ranging

SURVEY FORM FOR ATS USERS

1. NAME: R F HOSKYNS	3. DATE FORM COMPLETED: 11/9/75
2. ADDRESS: BRITISH POST OFFICE THQ/TD10.2.2 207 OLD STREET, LONDON EC1V 9PS ENGLAND	4. DATE RECEIVED BY UD: 17 Sep 75

ϕ28

5. TITLE OF EXPERIMENT:
UNITED KINGDOM MARITIME SATELLITE TESTS VIA ATS-3, AUTUMN 1970

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☑ ATS-3 ☐ ATS-5

Date Started AUGUST 1970 | Date Ended DECEMBER 1970

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☑ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☑ k. Voice Communication
- ☑ l. Other MARITIME SATELLITE COMMUNICATIONS

8. OBJECTIVE OF EXPERIMENT:

1) TO ASSESS NARROWBAND MODULATION TECHNIQUES AND SPEECH PROCESSING METHODS FOR MARITIME MOBILE SATELLITE COMMUNICATIONS, IN A MARITIME ENVIRONMENT.

2) TO GAIN EXPERIENCE IN OPERATING MARITIME SATELLITE CIRCUITS.

9. PARTICIPATING ORGANIZATION | ADDRESS

POST OFFICE THQ/TD10.2.2 | 207 OLD STREET, LONDON EC1V 9PS, ENGLAND

Please also see attached sheet for a list of other organisations participating in the experiment.

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. "UK MARITIME SATELLITE TESTS AUTUMN 1970", 1971 (433)
REPORT PREPARED FOR THE AD-HOC UNITED KINGDOM
MARITIME SATELLITE TESTS COMMITTEE BY
b. THE POST OFFICE, THE UNIVERSITY COLLEGE OF SWANSEA
AND THE MARCONI COMPANY. Copy enclosed.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

COMMUNICATION TESTS BETWEEN THE CUNARD-BROCKLEBANK CONTAINER VESSEL "ATLANTIC CAUSEWAY" AND THE POST OFFICE COAST RADIO STATION AT BURNHAM-ON-SEA ENGLAND, VIA ATS-3, TESTS WERE ALSO CONDUCTED BETWEEN THE "ATLANTIC CAUSEWAY" AND THE MOJAVE ATS EARTH STATION.

TRANSMISSIONS WERE SPEECH, TELEPRINTER, FACSIMILE AND SELECTIVE CALLING.

SYSTEMS TESTED WERE FM (25 KHz and 12.5 KHz CHANNEL BANDWIDTHS), UNPROCESSED AND WITH SPEECH PROCESSING (COMPANDORS AND LINCOMPEX), AND DSBSC.

PERFORMANCE OF VARIOUS ANTENNAE EVALUATED.

13. OVERALL EVALUATION (Check one)

- ☐ a. Very useful; many benefits
- ☑ b. Useful
- ☐ c. Of some value
- ☐ d. No gain from experiment

Comments

PROVIDED USEFUL OPERATIONAL EXPERIENCE AND POINTERS FOR FUTURE DEVELOPMENT

14. ACCOMPLISHMENTS OF EXPERIMENT

DEMONSTRATED FEASIBILITY OF VOICE, TELEPRINTER AND FACSIMILE OVER SATELLITE CIRCUITS TO A MARITIME MOBILE TERMINAL.

SHOWED THAT FM WITH SPEECH PROCESSING (COMPANDORS) WOULD PROVIDE A SIGNIFICANT IMPROVEMENT IN SPEECH QUALITY, SUITABLE FOR CONNECTION TO PUBLIC TELEPHONE NETWORKS AND WITH EFFICIENT USE OF SATELLITE POWER AND BANDWIDTH.

REVEALED EFFECTS OF MULTIPATH FADING AND SHIP MOVEMENT.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

TESTS USEFUL IN TESTING THEORETICAL CONSIDERATIONS AND STIMULATING DEVELOPMENT OF COMPANDED FM FOR SPEECH TRANSMISSION, AND STABILISATION SYSTEMS FOR SHIP TERMINAL ANTENNAE.

UNREPRESENTATIVE FREQUENCY AND SHIP ANTENNA GAIN.

RESULTS AFFECTED BY SATELLITE SPIN MODULATION.

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

ATS-3; COMPANDORS; FACSIMILE; FREQUENCY MODULATION; LINCOMPEX; MARITIME SATELLITES; MULTIPATH FADING; NARROWBAND MODULATION; SELECTIVE CALLING; SHIP PITCH; SHIP ROLL; SPEECH PROCESSING; SPEECH TESTS; YAGI ANTENNA.

SURVEY FORM FOR ATS USERS

1. NAME: Earl C. Chamberlayne

3. DATE FORM COMPLETED: 16 September 1975

2. ADDRESS: Special Programs & Projects
National Institute of Allergy and
Infectious Diseases
National Institutes of Health, Bethesda, Md.
20014

4. DATE RECEIVED BY UD

#29

5. TITLE OF EXPERIMENT:
Feasibility Study of Satellite Use for Biomedical Research Communications

6. NAME/DESIGNATION OF SATELLITE [X] ATS-1 [ ] ATS-3 [ ] ATS-5

Date Started 4 October 1973 | Date Ended Continuing

7. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. A/C Communications
- [ ] c. Broadcasting
- [ ] d. Data Transmission
- [ ] e. Educational Applications
- [ ] f. Law Enforcement/ Criminal Justice
- [ ] g. Maritime Traffic Control
- [X] h. Medical/Health Applications
- [ ] i. Meteorology
- [ ] j. Navigation
- [X] k. Voice Communication
- [ ] l. Other _____

8. OBJECTIVE OF EXPERIMENT: To determine the usefulness of communication satellite for informal discussions, between biomedical research investigators, on research plan design, progress reports and interpretation of results of ongoing research investigations, involving scientists at isolated or widely scattered sites. Also for the conduct of scientific conferences involving groups of scientists at widely scattered sites.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
University of Hawaii	Honolulu, Hawaii
Naval Arctic Research Station	Barrow, Alaska
Univ. of the South Pacific Station	Rarotonga, Cook Islands
Wellington Polytechnical Institute	Wellington, N.Z.

Via phonepatch: Various scientists of universities and research institutions throughout the U.S.A.

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Dr. Eric Otteson	LPD, NIAID, NIH, DHEW	301-496-4640
Dr. Samuel Baron	Univ. of Texas, Galveston	713-765-2321
Dr. Dale Van Kirk	LID, NIAID, NIH, DHEW	301-496-5811
Dr. Leon Rosen	Univ. of Hawaii	808-732-7702

1. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. none

b.

c.

d.

e.

f.

*Please send copies of the above items as available

2. DESCRIPTION OF EXPERIMENT Satellite time has been devoted mainly to informal discussions of research protocols, progress of ongoing research, and interpretation of research results; plus conferences on a number of research subjects. Examples:
a) When yellow fever virus extended in the jungle monkey population from Colombia up through Panama as far as the Panama Canal, there was great alarm that the yellow fever virus would thusly travel up through Central America (now free of yellow fever) and reach the southern part of the United States where the urban vector of yellow fever (Aedes egypti mosquito) is very prevalent. In order to plan an all-out attack and stop the northern movement of the virus at the Panama Canal, it was necessary to learn which species of mosquitoes were the effective vectors of the wild strain of yellow fever virus. Such laboratory transmission studies could not be done safely in Panama or any area where known vectors of yellow fever existed. The Rocky Mountain Laboratory, Hamilton, Montana was selected as a safe geographic area and a laboratory with the needed insectry facilities and technicians. The scientific competence to plan and supervise the study existed at the University of Hawaii (Dr. Leon Rosen). Using ATS-1 for almost daily communications between Honolulu and Bethesda, Md. and phonepatch connections to the Rocky Mountain Laboratory (RML), and several consultants in different parts of the U.S.A., the needed experiments were conducted at RML. The results of the transmission studies were passed to the authorities at Panama, where subsequent control measures were successful in stopping the wave of jungle yellow fever.
b) Three research scientists of the NIAID, Bethesda, Md. went to Rarotonga, Cook Islands to conduct, in collaboration with the health authorities there, a study of filariasis in the total population of Mauke Island. Although the best of planning had occurred in terms of study procedures, equipment and supplies to be taken, many unforeseen situations arose that required frequent and prompt communications with research

(cont'd)

3. OVERALL EVALUATION (Check one) Comments

- [X] a. Very useful; many benefits — Cuts distance, time and expenditure of money by 10^2 over other means.
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

12. Cont'd

colleagues in Bethesda, Honolulu and different parts of the United States. Shortages of supplies and equipment were ordered via satellite communications and shipped promptly via airfreight. The determination of what items to order, and the interpretation of field observations with subsequent changes in the research protocols, were accomplished through discussions with colleagues via the satellite. This included the addition to the study of tissue typing of the study population. To accomplish this, arrangements were made for a specialist, plus equipment and supplies to join the study team in Mauke Island. Had the satellite not been available and the correspondence conducted via letter, the conclusions about field observations and the changes in the study procedure could not have been done in the critical time period with respect to the phases of the disease situation.

c) Research scientists at NIAID, Bethesda, Md. are studying non-bacterial diarrhea or viral enteritis in newborn children. This is a devastating disease of babies that not infrequently causes deaths. They and other investigators have discovered that a similar virus causes the same condition in newborn calves. Indepth study of the calf virus is meaningful to expanded knowledge of this disease and possibly the development of a vaccine for use on newborn children. Because of the use by farmers in the U.S.A. of an anti-diarrhea calf vaccine, it has not been possible to gather from calves in the U.S.A. of disease-producing virus that is not contaminated with the vaccine virus. Similar studies are being conducted in New Zealand where regulations prevent the use of the calf anti-diarrhea vaccine. A satellite conference was arranged between research investigators in Bethesda, Md. and in Wellington, New Zealand. All aspects and problems of these research studies were thoroughly discussed, and arrangements made for collaboration in these investigations. It would have cost thousands of dollars and several days of time to accomplish the communications vital to these studies, which were accomplished with ease and in less than two hours of total time via satellite. In addition, during the Bethesda-Wellington conference, five other satellite stations in the South Pacific were tuned in, and allowed dozens of interested medical practitioners and research scientists to monitor the conference, ask questions and make comments about the disease and the research studies.

14. ACCOMPLISHMENTS OF EXPERIMENT

The experience, so far, has proven that ATS satellite radios, with phonepatch equipment, will afford any two or more research scientists in different parts of the coverage area, no matter how isolated, to communicate effectively and frequently about research studies in progress or in planning the next research experiments. It has shown, also, that this means of communication can be highly useful for continuing education of research scientists, medical and health professionals.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

For scientific communications, satellite radio provides a step forward as large as the telephone did in its time. It will bring the conference to the scientists, rather than the scientists to the conference, and with many advantages. The participating scientists can be in widely scattered and isolated sites; each scientist can participate from his own laboratory, the locale of all his research data and research team members; it affords more frequent conferences; and it enables large savings in research time and money. It has a tremendous potential for use in continuing education in the health professions field.

A logical development of the use of satellites for biomedical scientific communications is handicapped, at this time, by the lack of more prevalent existence of groundstation transceivers. While purchase of such equipment is appropriate as a research expense, grant-in-aid agencies and institution officials have yet to learn of the value of this modern means of scientific communications.

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

biomedical research, scientific communications, isolated scientists, field research, continuing education, conferencing.

SURVEY FORM FOR ATS USERS

1. NAME: Foundation for Applied Communication Technology
Kathryn S. Caldwell

2. ADDRESS: 1212 Peninsula Dr.
Lake Almanor, Ca 96137

3. DATE FORM COMPLETED

4. DATE RECEIVED BY UD

$\phi 3\phi$
4-11

5. TITLE OF EXPERIMENT: Veterans Administration Experiment in Health Communication on ATS-6: Computer-Mediated Events

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☒ ATS-3 ☐ ATS-5

Date Started January-1975 Date Ended April 1975

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☑ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☒ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☒ k. Voice Communication
- ☐ l. Other Computers

8. OBJECTIVE OF EXPERIMENT:

1. CAI expt: to compare satellite mediated transmissions with telephone linkages between computer and receiver

2. Computer-managed patient information: to field test satellite-linked computer-managed patient assessment

9. PARTICIPATING ORGANIZATION — ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
Veterans Administration	~~810 Vermonth Ave., Wash. D.C.~~
VA-Fayetteville, N.C.	
VA-Altoona, Pa.	
VA-Salisbury, N.C.	
VA-Salt Lake City, Utah	

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Reed M. Gardner	Dept. of Biophysics and Bioengineering, L.D.S. Hospital, SLC, Utah	801-322-5761
Earl Cole	SLC VA Hospital, Dept. of Psych.	582-1565

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Caldwell, Kathryn S. "Final Report: Veterans Administration Experiment on Applications Technology Satellite-6

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

CAI: Fayetteville linked to SLC computer via telephone line for 4 weeks; then asked to use only during broadcast period on ATS-6, when Altoona VA was linked to computer via ATS-3. Comparison made between land line and Computer.

Computer-managed program: Patients in Salisbury VA took battery of tests via satellite linkage to computer at SLC VA hospital.

13. OVERALL EVALUATION (Check one)

- ☐ a. Very useful; many benefits
- ☒ b. Useful
- ☐ c. Of some value
- ☐ d. No gain from experiment

Comments

Software for both programs was ~~said to be very useful and~~ potentially beneficial to hospital. however, must be available on 24 ~~hr. basis; so land lines better~~ linkage than satellite at this ~~point. ATS-3 inadequate to carry~~ linkages to both computers simultaneously.

230

14. ACCOMPLISHMENTS OF EXPERIMENT

Ascertained that satellite linkages are entirely adequate to provide reliable channels to link computers and users, especially to areas where land lines are difficult to provide, are prohibitively expensive, or when land lines are overburdened and hard to get on to.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

Satellites probably are not the most efficient transmitters of computer information at this point: other methods, land lines, are sufficient in most cases and computer technology is developing at such a rate that a computerized network among hospitals would soon become obsolete, especially when operated via satellite. If satellites should become permanent, one central computer feeding into minicomputers in hospitals during off hours on satellite might be an option to consider. Uses would be for patient management, follow-up (PSRO control), conference participation on individual basis, provision of cont. ed. and in-service materials.

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

Patient-management by satellite
Computer-satellite applications to health care

SURVEY FORM FOR ATS USERS

1. NAME:
M. Max Garcia

2. ADDRESS: EG&G, Inc.
P. O. Box 4339, Station A
Albuquerque, New Mexico 87106

3. DATE FORM COMPLETED
September 22, 1975

4. DATE RECEIVED BY UD

5. TITLE OF EXPERIMENT:
Bi-Hemispherical Communications Feasibility Study

6. NAME/DESIGNATION OF SATELLITE ☒ ATS-1 ☐ ATS-3 ☐ ATS-5

Date Started | Date Ended

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☑ b. A/C Communications
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☒ k. Voice Communication
- ☐ l. Other _____

8. OBJECTIVE OF EXPERIMENT: This study was conducted to determine the feasibility of using the ATS-1 satellite to maintain voice communications between two aircraft flying at high altitude in high latitudes in opposite hesispheres.

9. PARTICIPATING ORGANIZATION | ADDRESS

EG&G, Inc.	P. O. Box 4339, Station A, Albuquerque, New Mexico 87106
Los Alamos Scientific Laboratory	P. O. Box 1663, Los Alamos, New Mexico 87545

10. Other Persons Involved in Experiment that Should Be Contacted None

NAME	ADDRESS	PHONE

11. TECHNICAL REPORTS/JOURNAL ARTICLES* None
(List by author, title, technical report number or journal citation, date)

a.

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT Two NC-135 jet aircraft "Flying Laboratories" were equipped with VHF-FM transceivers and antennas. The equipment used is standard off-the-shelf Motorola communication units, a 500 watt Linear Power Amplifier and a Dorne Margolin DMC-33 Antenna.

13. OVERALL EVALUATION (Check one)

- [X] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

Comments

The mission requirements were all met on those operations where ample satellite time was devoted to this program.

14. ACCOMPLISHMENTS OF EXPERIMENT Voice communication between the two test aircraft was maintained for a substantial part of the test schedule. During periods of extensive auroral activity, the atmospheric noise rendered the system unsuitable; however, this occurance was for short periods.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)
The feasibility of using ATS-1 for bi-hemispheric operations was established with minor exceptions. With the exceptions of those periods when the aircraft were in high auroral activity or where flying at the extreme high latitudes, ATS-1 provided adequate communications for the type of mission that we conducted.

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

None

SURVEY FORM FOR ATS USERS

1. NAME: Frank J. Janza

2. ADDRESS: 8181 Folsom Blvd., Space 166
Sacramento, CA 95826
(916)383-1861(home) (916)454-6916(school)

3. DATE FORM COMPLETED: October 8, 1975

4. DATE RECEIVED BY UD: September 30, 1975

032

5. TITLE OF EXPERIMENT:
California State University at Sacramento Project for Senior Design class in electrical and electronic engineering

6. NAME/DESIGNATION OF SATELLITE [X] ATS-1 [ ] ATS-3 [ ] ATS-5

Date Started 1971 Date Ended still going

7. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. A/C Communications
- [ ] c. Broadcasting
- [X] d. Data Transmission
- [X] e. Educational Applications
- [ ] f. Law Enforcement/ Criminal Justice
- [ ] g. Maritime Traffic Control
- [ ] h. Medical/Health Applications
- [X] i. Meteorology
- [ ] j. Navigation
- [ ] k. Voice Communication
- [X] l. Other Ground Stations

8. OBJECTIVE OF EXPERIMENT:

The work being done at CSUS is not an experiment. For the past four years, students in EE interested in satellite communications and sensing have been involved in building units for receiving the ESSA-8 and NOAA ATS transmissions. Each semester a new group gets involved and the project reaches closer to a completed system.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
California State University-Sacramento	6000 J. St., Sacto, CA 95819

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
None		

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Not applicable

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

The original goal in 1971 was to have senior EE students design and build a receiving system to obtain cloud pictures as transmitted by ESSA-8 at 137.62 MHz. With the limited funds, the students would not be able to complete a total system. Thus, each semester a new group would become indoctrinated and would acquire knowledge and experience on the satellite operation and function. My classes in Remote Sensing would also become partially involved in the project. The ATS operation has been purely an educational vehicle. With further support, the benefits of receiving NOAA-3 data would be invaluable to other classes.

13. OVERALL EVALUATION (Check one) Comments

- ☐ a. Very useful; many benefits
- ☒ b. Useful
- ☐ c. Of some value
- ☐ d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

Over the past four years, approximately 40 electrical engineering students have learned about satellites as they relate to remote sensing, communications, and operations.

The department has been able to slowly gather equipment through gifts from the U.S. Weather Bureau in Redwood City and other sources. Shortly, CSUS will be able to receive and place on facsimile the cloud cover over the Sacramento area. Classes in Remote Sensing, Senior Design, Geography and the Environmental Sciences will be able to use the information.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

1. Progress has been all good, but show grants, etc., would have been exceedingly helpful.

2. Students vanished too soon requiring retraining and educating.

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

Educational - Electrical Engineers, Interdisciplining, Public

Please give a telephone call and I can tell you more about probably what you would like to hear. I'm not sure I gave you the information desired.

SURVEY FORM FOR ATS USERS

1. NAME: D. Clement, Acting Chief Communications Branch

2. ADDRESS: U. S. ERDA
Nevada Operations Office
Eng. & Const. Mgmt. Div.
Las Vegas, Nevada

3. DATE FORM COMPLETED: September 17, 1975

4. DATE RECEIVED BY UD

#33

5. TITLE OF EXPERIMENT: PROJECT "LOXIA"

6. NAME/DESIGNATION OF SATELLITE [X] ATS-1 [ ] ATS-3 [ ] ATS-5

Date Started MAY 1, 1975 | Date Ended MAY 15, 1975

7. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. A/C Communications
- [ ] c. Broadcasting
- [ ] d. Data Transmission
- [ ] e. Educational Applications
- [ ] f. Law Enforcement/ Criminal Justice
- [ ] g. Maritime Traffic Control
- [ ] h. Medical/Health Applications
- [ ] i. Meteorology
- [ ] j. Navigation
- [ ] k. Voice Communication
- [X] l. Other SLOW SCAN VIDEO

8. OBJECTIVE OF EXPERIMENT:

Transmission of slow scan video in support of a Barium injection experiment for field line tracing.

ORIGINAL PAGE IS
OF POOR QUALITY

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
U. S. ERDA	Nevada Operations Office, Las Vegas, NV
Telcom, Inc.	2634 State Street, Las Vegas, NV
Reynolds Elec. & Eng. Co., Inc.	2501 Wyandotte, Las Vegas, NV

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
N/A		

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a.

b.

N/A

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

Development and utilization of special equipment in an attempt to transmit slow scan video via ATS-1 satellite using narrow band communications equipment.

13. OVERALL EVALUATION (Check one) Comments

- ☐ a. Very useful; many benefits
- ☐ b. Useful
- ☒ c. Of some value
- ☐ d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

Transmission attempt unsuccessful.

Determined the need for improving equipment developed and acquiring wide band RF equipment for use as a means of increasing the video throughput rate.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

N/A

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

N/A

SURVEY FORM FOR ATS USERS

1. NAME: D. Clement, Acting Chief Communications Branch

2. ADDRESS: U. S. ERDA
Nevada Operations Office
Eng. & Const. Mgmt. Div.
Las Vegas, Nevada

3. DATE FORM COMPLETED: September 17, 1975

4. DATE RECEIVED BY UD

034

5. TITLE OF EXPERIMENT: PROJECT "TORDO"

6. NAME/DESIGNATION OF SATELLITE ☒ ATS-1 ☐ ATS-3 ☐ ATS-5

Date Started DECEMBER 1974 | Date Ended JANUARY 1975

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☒ j. Navigation
- ☒ k. Voice Communication
- ☐ l. Other Ground Stations

8. OBJECTIVE OF EXPERIMENT:

Provision of voice/data communications during critical scientific experiments between remote tracking stations and airborne scientific stations.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
U. S. ERDA	Nevada Operations Office, Las Vegas, NV
Telcom, Inc.	2634 State Street, Las Vegas, NV
Reynolds Elec. & Eng. Co., Inc.	2501 Wyandotte, Las Vegas, NV

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
N/A		

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. REECo Report, 561-01-135, February 25, 1975

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

Transmission of voice/data information via ATS-1 in support of sophisticated scientific experiments during critical time periods. Use was made of specially designed mobile and portable ground stations. These ground stations were designed for remote operation, non-operation interlocks, and antenna switch-over for transmitting and receiving. Portable ground stations were designed to be packaged into a Samsonite-type suitcase and readily established for transmission.

13. OVERALL EVALUATION (Check one) Comments

- [X] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

The provision of satisfactory voice/data communications utilizing the ATS-1 and portable ground stations to interconnect remote regions of the earth. Communication was maintained between the Northwest Territory, Alaska and Nevada.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

N/A

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

N/A

SURVEY FORM FOR ATS USERS

1. NAME: D. Clement, Acting Chief Communications Branch

2. ADDRESS: U. S. ERDA
Nevada Operations Office
Eng. & Const. Mgmt. Div.
Las Vegas, Nevada

3. DATE FORM COMPLETED: September 17, 1975

4. DATE RECEIVED BY UD

435

5. TITLE OF EXPERIMENT: POST CANNIKIN - AMCHITKA, ALASKA

6. NAME/DESIGNATION OF SATELLITE [x] ATS-1 [ ] ATS-3 [ ] ATS-5

Date Started MAY 1974 | Date Ended SEPTEMBER 1974

7. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. A/C Communications
- [ ] c. Broadcasting
- [x] d. Data Transmission
- [ ] e. Educational Applications
- [ ] f. Law Enforcement/ Criminal Justice
- [ ] g. Maritime Traffic Control
- [ ] h. Medical/Health Applications
- [ ] i. Meteorology
- [ ] j. Navigation
- [x] k. Voice Communication
- [x] l. Other Ground Stations for ATS-1

8. OBJECTIVE OF EXPERIMENT:

Reliable/portable ground station to provide voice/data communications via satellite.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
U. S. ERDA	Nevada Operations Office, Las Vegas, NV
Telcom, Inc.	2634 State Street, Las Vegas, NV
Reynolds Elec. & Eng. Co., Inc.	2501 Wyandotte, Las Vegas, NV

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
N/A		

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. U. S. AEC/NV Letter, Symbol PCA:JAS-180, dated September 24, 1974

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

Development and utilization of a portable satellite ground station for the transmission of voice/data information. A portable satellite station was fabricated into a complete package to fit a Samsonite suitcase.

13. OVERALL EVALUATION (Check one) Comments

- [X] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

Provision of a portable and reliable means of communications to remote and uninhabitable areas for scientific investigations.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

Use of ATS-1 enhanced the operational aspects of the project and provided communications heretofore unattainable.

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

N/A

SURVEY FORM FOR ATS USERS

1. NAME: D. Clement, Acting Chief Communications Branch

2. ADDRESS: U. S. ERDA
Nevada Operations Office
Las Vegas, Nevada

3. DATE FORM COMPLETED: September 17, 1975

4. DATE RECEIVED BY UD

436

5. TITLE OF EXPERIMENT:
PROJECT "ZURITA"

6. NAME/DESIGNATION OF SATELLITE [X] ATS-1 [ ] ATS-3 [ ] ATS-5

Date Started JANUARY 1973 | Date Ended FEBRUARY 1973

7. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. A/C Communications
- [ ] c. Broadcasting
- [ ] d. Data Transmission
- [ ] e. Educational Applications
- [ ] f. Law Enforcement/ Criminal Justice
- [ ] g. Maritime Traffic Control
- [ ] h. Medical/Health Applications
- [ ] i. Meteorology
- [ ] j. Navigation
- [X] k. Voice Communication
- [X] l. Other Ground Stations

8. OBJECTIVE OF EXPERIMENT:

Real time communications between Alaska and Hawaii for project observation and launch areas.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
U. S. ERDA	Nevada Operations Office, Las Vegas, Nev.
Telcom, Inc.	2634 State Street, Las Vegas, Nev.
Reynolds Elec. & Eng. Co., Inc.	2501 Wyandotte, Las Vegas, Nev.

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
N/A		

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Telcom Report No. TNR-323-084, May 3, 1974

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

Voice communications using specially designed satellite ground stations, type second generation, incorporating solid state radio equipment. Utilization of a unique VHF cross-over link arrangement to provide satellite communication capability to a desired location.

13. OVERALL EVALUATION (Check one) Comments

- [X] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

Ability to provide inexpensive means of remoting a fixed satellite installation for special assignments.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

N/A

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

N/A

SURVEY FORM FOR ATS USERS

1. NAME: Alfred Y. Wong

2. ADDRESS: Department of Physics
UCLA
Los Angeles, CA 90024

3. DATE FORM COMPLETED: September 24, 1975

4. DATE RECEIVED BY UD

037

5. TITLE OF EXPERIMENT: Monitor of Ionospheric Disturbances

6. NAME/DESIGNATION OF SATELLITE [X] ATS-1 [X] ATS-3 [ ] ATS-5

Date Started	Date Ended

7. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. A/C Communications
- [ ] c. Broadcasting
- [ ] d. Data Transmission
- [x] e. Educational Applications
- [ ] f. Law Enforcement/ Criminal Justice
- [ ] g. Maritime Traffic Control
- [ ] h. Medical/Health Applications
- [ ] i. Meteorology
- [ ] j. Navigation
- [ ] k. Voice Communication
- [ ] l. Other Phase comparison

8. OBJECTIVE OF EXPERIMENT: To teach students in a plasma physics laboratory how the phase of ATS signal is related to plasma fluctuations in ionosphere and magnetosphere.

9. PARTICIPATING ORGANIZATION ADDRESS

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a.

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

ATS-1 and ATS-3 transmitted signals are monitored over a 24-hour period on chart recorder. Correlations with the solar cycle are made. Spectrum analyses are also used to look for sidebands and instabilities.

13. OVERALL EVALUATION (Check one) Comments

- [x] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

Education Experiment
Faraday Rotation
Plasma Fluctuation

SURVEY FORM FOR ATS USERS

1. NAME: Moody College of Marine Sciences and Maritime Resources

2. ADDRESS: P. O. Box 1675
Galveston, Texas 77550

3. DATE FORM COMPLETED
August 21, 1975

4. DATE RECEIVED BY UD
8/25/75

038

5. TITLE OF EXPERIMENT: Caribbean Thermal Structure Study (con't.)
(CLIPPER Experiment III)

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☒ ATS-3 ☐ ATS-5

Date Started 6-8-75 | Date Ended 8-3-75

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☒ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☒ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☐ l. Other Oceanography

8. OBJECTIVE OF EXPERIMENT:
To seek existence of "fronts" in the ocean by analyses of temperature structure.

9. PARTICIPATING ORGANIZATION | ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
NASA-Goddard Space Flight Center	Greenbelt, Maryland 20771
NASA-Ames Research Center	Moffett Field, California 94035

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Mr. Charles Vermillion	NASA-Goddard Space Flight Center Greenbelt, Maryland 20771	301/982-5111
Dr. John C. Arvesen	NASA-Ames Research Center Moffett Field, California 94035	415/965-5376

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number, or journal citation, date)

a. None to be prepared until experiment is completed.

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

Measurements of:

Surface temperature by radiation techniques (Barnes PRT-5)
Bucket temperatures
Inlet temperatures
Temperatures vs. depth (XBT)
Salinity (CSIRO Salinometer)
Wind velocity (Gill Trivane)
Rain Rate (NASA Electronic Sampler)

13. OVERALL EVALUATION (Check one)

Comments

☐ a. Very useful; many benefits

☒ b. Useful

☐ c. Of some value

☐ d. No gain from experiment

It is too early to make a meaningful assessment. This is a long-term experiment.

14. ACCOMPLISHMENTS OF EXPERIMENT

Better understanding of variability involved and lower (average) surface temperatures in Caribbean has led to cancellation of hurricane watch experiment this fall because of interpretation that severe storm frequency will be low this fall.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

Much improvement over past year's efforts - meaningful analyses possible and underway.

Unfortunately, no rain encountered on cruise during stellite (NIMBUS 6) pass - to provide ground truth for satellite sensors.

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

Oceanography

Meteorology

Data Transmission

SURVEY FORM FOR ATS USERS

1. NAME: Moody College of Marine Sciences & Maritime Resources

2. ADDRESS: P. O. Box 1675
Galveston, Texas 77550

3. DATE FORM COMPLETED
August 21, 1975

4. DATE RECEIVED BY UD
8/29/75

#39

5. TITLE OF EXPERIMENT:
Caribbean Thermal Structure Study
(CLIPPER Experiment II)

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☒ ATS-3 ☐ ATS-5

Date Started 6-5-74 Date Ended 8-5-74

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☒ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☒ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☐ l. Other Oceanography

8. OBJECTIVE OF EXPERIMENT:
To seek existence of "fronts" in the ocean by analyses of temperature structure.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
NASA-Goddard Space Flight Center	Greenbelt, Maryland 20771
NASA-Ames Research Center	Moffett Field, California 94035

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Mr. Charles Vermillion	NASA-Goddard Space Flight Center Greenbelt, Maryland 20771	301/982-5111
Dr. John C. Arvesen	NASA-Ames Research Center Moffett Field, California 94035	415/965-5376

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number, or journal citation, date)

a. None to be prepared until experiment is completed.

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

Measurements of:

Surface temperature by radiation techniques (Barnes PRT-5)
Bucket temperatures
Inlet temperatures
Temperatures vs. depth (XBT)
Salinity (CSIRO Salinometer)
Chlorophyll content (Turner Fluorimeter)

13. OVERALL EVALUATION (Check one)

Comments

☐ a. Very useful, many benefits

☒ b. Useful — It is too early to make a meaningful assessment. This is a long-term experiment.

☐ c. Of some value

☐ d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

Some "ground truth" data for NASA; better awareness of parameter requirements and instrumentation.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

Useful data were obtained and transmitted back to Galveston for nearly "on line" analyses.

Malfunction of PRT-5 by improper calibration procedures at Barnes detracted greatly.

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

Oceanography

Meteorology

Data Transmission

SURVEY FORM FOR ATS USERS

1. NAME: Moody College of Marine Sciences and Maritime Resources

2. ADDRESS: P. O. Box 1675
Galveston, Texas 77550

3. DATE FORM COMPLETED
August 21, 1975

4. DATE RECEIVED BY UD
8/27/75

#43

5. TITLE OF EXPERIMENT:
South Atlantic Total Solar Eclipse Program
(CLIPPER Experiment I)

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☒ ATS-3 ☐ ATS-5

Date Started 6-7-73 | Date Ended 8-14-73

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☒ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☐ l. Other Oceanography

8. OBJECTIVE OF EXPERIMENT:

To participate as an ocean observation station and to conduct experiments to determine the effect of the total eclipse on the deep scattering layer.

PARTICIPATING ORGANIZATION	ADDRESS
Scripps Institute of Oceanography	San Diego, California 92132
NASA-Ames Research Center	Moffett Field, California 94035
NASA-Goddard Space Flight Center	Greenbelt, Maryland 20771

Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Dr. Elizabeth M. Kampa	University of California, La Jolla, California	714/453-2000
Dr. John C. Arvesen	NASA-Ames Research Center Moffett Field, California 94035	415/965-5376
Mr. Charles Vermillion	NASA-Goddard Space Flight Center Greenbelt, Maryland 20771	301/982-5111

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number, or journal citation, date)

a. Kampa, E. M., "Vertical Migration of Sonic Scattering Layer."

b.

c. (No copies of this report are available except, possibly, from Dr. Kampa.)

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

Observations of the eclipse were made visually and recorded by standard photographic techniques. Level variations of the scattering layer were measured acoustically and recorded in analog form.

OVERALL EVALUATION (Check one) Comments

- [X] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

Besides adding to the inventory of phenomena during a total solar eclipse, the variation of the deep scattering layer with light intensity was verified. In addition, the CLIPPER, during its cruise throughout the South Atlantic and Mediterranean, took standard bathymetric and meteorological observations for the Navy, and "ground truth" observations of temperature, salinity, and chlorophyll for NASA.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

Planned experiments were conducted without mishap or unanticipated difficulty. This was our first experiment with the ATS Communications Satellites, and the ease and reliability of this communication method is still generating ideas for use in oceanographic research.

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

Oceanography

Meteorology

Data Transmission

Solar Eclipse

Deep Scattering Layer

SURVEY FORM FOR ATS USERS

1. NAME: D. Clement, Acting Chief Communications Branch	3. DATE FORM COMPLETED: September 17, 1975
2. ADDRESS: U. S. ERDA Nevada Operations Office Eng. & Const. Mgmt. Div. Las Vegas, Nevada	4. DATE RECEIVED BY UD

#41

5. TITLE OF EXPERIMENT: PROJECT "ENIWETOK"

6. NAME/DESIGNATION OF SATELLITE ☒ ATS-1 ☐ ATS-3 ☐ ATS-5

Date Started VEMBER 1972 | Date Ended FEBRUARY 1973

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☒ l. Other Radiological

8. OBJECTIVE OF EXPERIMENT:

Transmission of radiological data in facsimile format.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
U. S. ERDA	Nevada Operations Office, Las Vegas, NV
Telcom, Inc.	2634 State Street, Las Vegas, NV
Reynolds Elec. & Eng. Co., Inc.	2501 Wyandotte, Las Vegas, NV

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
N/A		

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Telcom Report No. TNR-323-082, May 3, 1973

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

An Atomic Energy Commission sponsored program on Eniwetok required the transmission of radiological survey data to the CONUS. This program experimented with the method of accoustical and metallic telephone line coupling. Noise suppression circuitry was included for data transmission using commercially available facsimile equipment.

ATS-1 was used to connect Eniwetok, Honolulu and Las Vegas, Nevada.

13. OVERALL EVALUATION (Check one) Comments

- [x] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

Successful facsimile transmission via satellite link using standard facsimile and radio equipment.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

Conclusion cannot be generalized to include all facsimile transmission equipment due to engineering design, delay, electronic interface, etc.

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

N/A

SURVEY FORM FOR ATS USERS

1. NAME: D. Clement, Acting Chief Communications Branch

2. ADDRESS: U. S. ERDA
Nevada Operations Office
Las Vegas, Nevada

3. DATE FORM COMPLETED: September 17, 1975

4. DATE RECEIVED BY UD

#42

5. TITLE OF EXPERIMENT: OPERATION "PICAPOSTE"

6. NAME/DESIGNATION OF SATELLITE [X] ATS-1 [ ] ATS-3 [ ] ATS-5

Date Started AUGUST 1972 | Date Ended NOVEMBER 1972

7. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [x] b. A/C Communications
- [ ] c. Broadcasting
- [ ] d. Data Transmission
- [ ] e. Educational Applications
- [ ] f. Law Enforcement/ Criminal Justice
- [ ] g. Maritime Traffic Control
- [ ] h. Medical/Health Applications
- [ ] i. Meteorology
- [x] j. Navigation
- [x] k. Voice Communication
- [ ] l. Other _____

8. OBJECTIVE OF EXPERIMENT:

Test effectiveness of a satellite link in maintaining voice communications between two aircraft, aircraft and ground stations.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
U. S. ERDA	Nevada Operations Office, Las Vegas, NV
Telcom, Inc.	2634 State Street, Las Vegas, NV
Reynolds Elec. & Eng. Co., Inc.	2501 Wyandotte, Las Vegas, NV
EG&G	680 East Sunset Road, Las Vegas, NV

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
N/A		

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Telcom Report No. TNR-323-070, February 7, 1973

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

Experiments were conducted to test the effectiveness of a satellite link in maintaining voice communications between two aircraft, an aircraft and different ground stations located in opposite hemispheres.

The satel' :e provided a primary means of communication between Alaska, Nevada, Hawaii, Canton Island, American Samoa and New Zealand.

Use was made of satellite ground stations designed by Telcom, Inc., and installed by REECo and EG&G.

13. OVERALL EVALUATION (Check one) Comments

- [X] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

Satisfactory satellite ground communications. Determination of the need to provide different ground station equipment that is easily transportable and redesign for a higher degree of performance.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

N/A

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

N/A

SURVEY FORM FOR ATS USERS

1. NAME: Wedemeyer, Charles A.

2. ADDRESS: 235 Lowell Hall
610 Langdon Street
The University of Wisconsin
Madison, Wisconsin 53706

3. DATE FORM COMPLETED: 11/15/75

4. DATE RECEIVED BY UD

043

5. TITLE OF EXPERIMENT: EDSAT, an acronym for "Educational Diffusion and Social Application of Telecommunications"

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☐ ATS-3 ☐ ATS-5

Date Started 1967 Date Ended 1974

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☒ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☒ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☐ l. Other _____

8. OBJECTIVE OF EXPERIMENT:

EDSAT was a series of studies and experiments intended to develop the characteristics and problems of education via satellite and other media, and to nurture the capacity for software development in the University.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
National Library of Medicine	Washington, D.C.
U.W. Space Science & Engineering Ctr.	Madison, Wisconsin

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
(see publications bibliography)		

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. (see Attachment)

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

Varied

13. OVERALL EVALUATION (Check one) Comments

- ☐ a. Very useful; many benefits
- ☒ b. Useful
- ☐ c. Of some value
- ☐ d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

Specific studies on satellite education; problems; potentials; development of software from faculty point of view.

In work in health/medicine, demonstrations of Ekg, etc. transmitted via satellite.

Light weight antenna.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

Good experience from point of view of problems of organizing faculty for employment of satellite, generation of software.

Technical problems and lack of adequate funding prevented more positive accomplishments.

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

Education
Satellite
Health
Medicine
ATS 1-3

SURVEY FORM FOR ATS USERS

1. NAME: Heather E. Hudson, PH.D.

2. ADDRESS: Institute for Communication Research, Cypress Hall, Stanford, CA 94305

3. DATE FORM COMPLETED: September 15, 1975

4. DATE RECEIVED BY UD

044

5. TITLE OF EXPERIMENT:

Participation in the Alaska Satellite Communications Project.

6. NAME/DESIGNATION OF SATELLITE ☒ ATS-1 ☐ ATS-3 ☐ ATS-5

Date Started June 14, 1971 Date Ended June 30, 1974

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☒ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☐ l. Other _____

8. OBJECTIVE OF EXPERIMENT:

To evaluate the Alaska biomedical communication project, examining available statistics on the utilization of medical communication facilities and other aspects of health-care delivery that might be affected by use of satellite radio.

9. PARTICIPATING ORGANIZATION	ADDRESS
Evaluator: Stanford University	a) Institute for Communication Research
Stanford, California 94305	b) Department of Electrical Engineering
	c) Faculty of Medicine

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Professor Glenn Stanley	University of Alaska, Geophysical Institute, Fairbanks, Alaska 99701	(907)479-7361
John Lee, Director, Alaska Area	Native Health Office, 3214 Wesleyan Dr., Anchorage, Alaska 99504	
Mr. Al Feiner	Practical Concepts Incorporation, 1030 15th St., N.W. Suite 200, Washington, D.C. 20036	(202)833-1040

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Hudson, Heather E. & Parker, Edwin B., Medical Communication in Alaska by Satellite, New England Journal of Medicine, 289, 1351-1356, Dec. 20, 1973.

b. Kreimer, Osvaldo, with Heather Hudson & Dennis Foote, Health Care and Satellite Radio Communication in Village Alaska. Institute for Communication Research, Stanford University and the Lister Hill National Center for Biomedical Communication

c. (0052)

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

The overall framework of the evaluation was to examine each facet of satellite radio communication used for health care delivery to remote Alaskan villages. The Tanana Public Health Service Unit in central Alaska provides health care delivery to over twenty villages. To evaluate the technical performance of the satellite system, nine of these villages with satellite radios were designated as the "experimental villages." These were Allakaket, Anaktuvuk Pass, Arctic Village, Chalkyitsik, Huslia, Nulato, Ruby, Stevens Village and Wenetie. Data was gathered before (one year) and after (one year) installation of the satellite. A control group of four villages with high frequency (HF) radio provided a base line comparison. An analysis of radio logs of the health aide-to-doctor consultation known as "doctor call" between Tanana Hospital and those villages with HF radio and those with satellite radio was conducted to determine the number of medical episodes treated and the quality of these consultations.

A questionnaire was administered to health aides in nine villages with satellite radios and five villages with HF radios to determine potential effects of improved communication on village health care. Health aides using satellite radio were asked to compare their answers to conditions before its installation. Questionnaires included checks for influence of factors other than the improvement in communications. A deliberate effort was made to avoid mention of radio communication in the comparative questions so that respondents would not attempt to guess right answers.

To study whether or not the satellite radio consultation service had a learning effect on the health aides, their performance in confirmation or modification of the treatment plan by the doctor was compared.

An evaluation of the doctor-to-doctor consultations by satellite to determine if specialists could be contacted soo enough, if sufficient information was (continued on back)

13. OVERALL EVALUATION (Check one) Comments

- [X] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

The system enabled native village aides to offer improved first-line medical care in the villages. After one year of satellite use, the number of patients in the experimental villages who were treated with the advise of a doctor more than tripled.

Village health aides said they felt more confident in treating patients and learned by listening to the daily medical traffic.

Native representative and health care providers have repeatedly stressed the importance of the ATS-1 system which is still in use for medical communication. They do not want the ATS-1 system removed until a permanent replacement is installed.

The Public Health Service and the State of Alaska are now implementing a plan to provide reliable communication to every village with over 50 inhabitants.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

The experiment demonstrated the importance of communication in providing health care in rural areas. With the back-up of a doctor, a local person with minimal training can provide first-line medical care. This approach of using communication could be applied in other developing regions around the world. The use of the satellite for linking regional hospitals for "grand rounds" was unsuccessful primarily because of the extreme workload of the rural doctors who were not able to participate during scheduled periods.

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

Biomedical
Medical
Communications
Telecommunication
Remote
Rural
Village
Satellite
Radio
Telephone
Northern
Arctic
Alaska(n)
Two-way
Paramedical

SURVEY FORM FOR ATS USERS

1. NAME: D. Hirst

2. ADDRESS: Radio & Navigation Dept.
Royal Aircraft Establishment
Farnborough Hants, England

3. DATE FORM COMPLETED
7/10/75 (Oct. 7, 1975)

4. DATE RECEIVED BY UD

045

5. TITLE OF EXPERIMENT: I - Ionospheric Scintillation Measurements
II - Chirp data transmission measurements

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☒ ATS-3 ☐ ATS-5

Date Started | Date Ended

7. SUBJECT CATEGORY OF EXPERIMENT

- [X] a. Air Traffic Control
- [X] b. A/C Communications
- [ ] c. Broadcasting
- [ ] d. Data Transmission
- [ ] e. Educational Applications
- [ ] f. Law Enforcement/ Criminal Justice
- [ ] g. Maritime Traffic Control
- [ ] h. Medical/Health Applications
- [ ] i. Meteorology
- [ ] j. Navigation
- [ ] k. Voice Communication
- [ ] l. Other Ionospheric scintillation

8. OBJECTIVE OF EXPERIMENT:

I - To assess the effect of ionospheric scintillation on aeronautical satellite communications

II - To assess the performance of chirp modulation as a means of combating sea-reflection multipath in an aeronautical satellite system

9. PARTICIPATING ORGANIZATION — ADDRESS

I - Spembly Ltd. — Enham Arch, Newbury Road, Andover, Hants

II - Nil

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Interim Report No. 1 (copy enclosed, this report issued prior to funding of contractual assistance)
Final Technical Report (copy enclosed)
b. RAE Tech Report 69066 (copy enclosed)

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

See reports enclosed

13. OVERALL EVALUATION (Check one)

Comments

- ☐ a. Very useful; many benefits
- ☒ b. Useful
- ☐ c. Of some value — Of limited value because aircraft used linearly polarized antenna
- ☐ d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

I - Accumulation of statistical data regarding ionospheric scintillation.

II - Qualitative demonstration of the merit of chirp modulation in a multipath environment.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

Aeronautical Satellite Communication
Scintillations
Chirp Modulation

SURVEY FORM FOR ATS USERS

1. NAME: Edward W. Pearl
for T. Theodore Fujita

2. ADDRESS: University of Chicago
SMRP
5734 S. Ellis Avenue
Chicago, Illinois 60637

3. DATE FORM COMPLETED
10-8-75

4. DATE RECEIVED BY UD

046

5. TITLE OF EXPERIMENT:
Utilization of ATS Imagery in Meteorological Analysis

6. NAME/DESIGNATION OF SATELLITE [X] ATS-1 [X] ATS-3 [ ] ATS-5

Date Started 1967 | Date Ended ? Present

7. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. A/C Communications
- [ ] c. Broadcasting
- [ ] d. Data Transmission
- [ ] e. Educational Applications
- [ ] f. Law Enforcement/ Criminal Justice
- [ ] g. Maritime Traffic Control
- [ ] h. Medical/Health Applications
- [X] i. Meteorology
- [ ] j. Navigation
- [ ] k. Voice Communication
- [ ] l. Other _____

8. OBJECTIVE OF EXPERIMENT:

Multifarious objectives:

(1) cloud and duct tracking
* Potentially useful as a forecasting tool
*(2) studies of storm modification
*(3) Computing cloud velocities inferring windspeeds
*(4) Studies of tops of severe local storms
*(5) Inflow and outflow budgets

9. PARTICIPATING ORGANIZATION — ADDRESS

National Aeronautics and Space Admin.	Goddard Space Flight Center, Greenbelt, MD (NGR-14-001-008)
National Oceanic & Atmospheric Admin.	World Weather Bldg., Washington, D.C.
National Science Foundation	1800 "G" St., N.W., Washington, D.C. 20550

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Edward Pearl	5734 S. Ellis Ave., Chicago, Ill 60637	(312)753-8114
William Shenk	GSFC, Greenbelt, Maryland	(301)982-5948
Linwood Whitney	NOAA, NESS, MSC, W.W.B., Washington, D.C.	(301)763-812
Eugene W. Bierly	NSF-1800 G St., N.W., Washington, D.C.	(202)634-15

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. T. T. Fujita and J. J. Tecson: A Kinematic Analysis of Tropical Storm Based on ATS Cloud Motions, SMRP Research Paper #125, August 1974

b. (See attachment - copies sent under separate cover)

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

To analyze and understand atmospheric phenomena as seen through ATS imagery -
cloud velocities were measured using the METRICOM method and computed velocities were related to observed windspeeds at various levels
Meso scale features were observed especially those related to severe weather
Overshotting tops of severe thunderstorms were analyzed for evaluation as a future forecasting tool for hail, tornadoes, etc.
Outflow from thunderstorms and hurricanes was studied to infer the dynamics involved
Critical Analysis of the benefits and failures of the first ATS system was performed to improve or change the objectives of future satellite programs.

13. OVERALL EVALUATION (Check one) Comments

- [x] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

Relating cumulus velocities to actual windspeeds in the high and low levels
Correlations of overshooting tops of severe thunderstorms with severe ground events such as hail and tornadoes.
Analysis of meso-scale features and their relation to other features, their growth, and their decay.
Inflow and outflow especially of anvil growth and also for a hurricane situation - clues are obtained as to their meso and synoptic environments.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

There were very strong positive benefits received from the ATS-1 and ATS-3 satellites. For the first time meteorologists were able to view almost on time changes in the meso-scale atmosphere. By utilizing this obvious advantage one could obtain approximate windspeeds in areas where upper level sounding were virtually unavailable. The structure of severe thunderstorms and some of the potential causes of them could be monitored and effectively used. Tropical events could be watched and their budgets analyzed. Most importantly hurricanes could be observed and tracked and changes in their strength were related to observable changes in cloud patterns. Overshooting tops of thunderstorms indicate the severity and possible their potential for producing hail, tornadoes, and heavy rain. Satellites with higher resolution in the visible and infrared will be a further benefit.

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

Clouds
Weather
Cloud Velocities
Dynamical Analysis
Mass Outflow
Inflow
Outflow
Tornadoes
Hail
Meso-Scale
Modification
Tracers
Spinscan, pitch, yaw
Anvil Growth
Overshooting tops, domes, turrets

a. T. T. Fujita and G. S. Forbes: Super-outbreak Tornadoes Of April 3, 1974 As Seen In ATS Pictures, SMRP Research Paper #124, August 1974.

b. Y. M. Chang: Analysis of Anvil Growth For ATS Pictures, SMRP Research Paper #122, July 1974.

c. E. W. Pearl: Characteristics of Anvil-Top Associated with the Poplar Bluff Tornado of May 7, 1973, SMRP Research Paper #119, January 1974.

d. T. T. Fujita: Overshooting Thunderheads observed from ATS and Learjet, SMRP Research Paper #117, January 1974.

e. T. T. Fujita, E. W. Pearl and W. E. Shenk: Satellite-Tracked Cumulus Velocities, SMRP Research Paper #114, December 1973.

f. E. E. Balogun: A Study of Satellite-Obsefved Cloud Patterns of Tropical Cyclones, SMRP Research Paper #109, September 1972.

g. T. T. Fujita: Use of ATS Pictures in Hurricane Modification, SMRP Research Paper #106, August 1972.

h. T. T. Fujita: Tornado Occurrences related to Overshooting Cloud-Top Heights as determined from ATS Pictures, SMRP Research Paper #97, April 1972. NOT Available

i. T. T. Fujita and P. G. Black: In- and Outflow Field of Hurricane Debbie as revealed by Echo and Cloud Velocities from Airborne Radar and ATS-III Pictures, SMRP Research Paper #93, November 1970.

j. T. T. Fujita: Application of ATS III Photographs for determination of Dust and Cloud Velocities over Northern Tropical Atlantic, SMRP Research Paper #90, December 1970.

k. K. Ninomiya: Mesoscale Modification of Synoptic Situations over the Area of Thunderstorms Development as revealed by ATS III and Aerological Date, SMRP Research Paper #85, April 1970.

l. K. Ninomiya: Dynamical Analysis of Outflow from Tornado-Producing Thunderstorms as revealed by ATS III Pictures, SMRP Research Paper #81, December 1969.

j. T. T. Fujita and D. L. Bradbury: Determination of Mass Outflow from a Thunderstorm Complex using ATS III Pictures, SMRP Research Paper #79, April 1969.

k. T. T. Fujita, K. Watanabe and T. Izawa: Formation and Structure of Equatorial Anticyclones caused by Large-Scale Cross Equatorial Flows determined by ATS I Photographs, SMRP Research Paper #78, January 1969.

NOT AVAILABLE

l. T. T. Fujita, D. L. Bradbury, C. Murino and L. Hull: A Study of Mesoscale Cloud Motions Computed from ATS-I and Terrestrial Photographs, SMRP Research Paper #71, March 1968.

NOT AVAILABLE

SURVEY FORM FOR ATS USERS

1. NAME: Parviz Babai

2. ADDRESS: _____

3. DATE FORM COMPLETED: December 6, 1975

4. DATE RECEIVED BY UD

047

5. TITLE OF EXPERIMENT:

Remote Sensing of Ocean Parameters

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☐ ATS-3 ☐ ATS-5

Date Started I - October 17, 1974 II - August 1975

Date Ended I - February 24, 1975 II - September 1975

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☒ k. Voice Communication
- ☒ l. Other ~~Facsimile~~

8. OBJECTIVE OF EXPERIMENT:

Help calibrate different sensors to be used in oceanographic satellites.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
The Cousteau Society	
NASA	
Texas A and M	

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Capt. Cousteau		
Jack Hill	Texas A & M	(713) 845-5422

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Different reports were published by the Remote Sensing Center of Texas A&M University.

b. (Contact Jack Hill for further information)

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

These experiments were to emphasize the importance of oceanographic measurements and studies via satellites rather than oceanographic vessels.

13. OVERALL EVALUATION (Check one) Comments

- ☐ a. Very useful; many benefits
- ☒ b. Useful
- ☐ c. Of some value
- ☐ d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

Positive results for the first experiment. The sensors are calibrated and will be used on the Nimbus satellite.

No information on results of second experiment.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

The ATS system proved to be useful in transmitting and receiving relevant data.

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

Oceanography
Satellites
Sensors

SURVEY FORM FOR ATS USERS

1. NAME: Dr. Norman Abramson

2. ADDRESS: THE ALOHA SYSTEM
University of Hawaii
2540 Dole Street, Holmes 486
Honolulu, Hawaii 96822

3. DATE FORM COMPLETED: 10-20-75

4. DATE RECEIVED BY UD

(42

5. TITLE OF EXPERIMENT:
ATS-1 Computer Communications Experiment

6. NAME/DESIGNATION OF SATELLITE [X] ATS-1 [ ] ATS-3 [ ] ATS-5

Date Started January 1972 | Date Ended September 1974

7. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. A/C Communications
- [ ] c. Broadcasting
- [X] d. Data Transmission
- [ ] e. Educational Applications
- [ ] f. Law Enforcement/ Criminal Justice
- [ ] g. Maritime Traffic Control
- [ ] h. Medical/Health Applications
- [ ] i. Meteorology
- [ ] j. Navigation
- [ ] k. Voice Communication
- [ ] l. Other _____

8. OBJECTIVE OF EXPERIMENT:
To demonstrate the feasibility of packet broadcasting through the shared use of a satellite repeater providing computer-computer and terminal-computer communications between remotely located sites.

9. PARTICIPATING ORGANIZATION — ADDRESS

1. Spacecraft Data Systems Branch, NASA Ames Research Center — Moffett Field, California
2. THE ALOHA SYSTEM, University of Hawaii — Honolulu, Hawaii
3. University of Alaska — Fairbanks, Alaska

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Mr. Henry Lum	NASA Ames Research Center, Moffett Field, CA	(415)965-6530
Dr. Kenneth J. Kokier	University of Alaska, Fairbanks, Alaska 99701	(907)479-7152
Dr. Dale Lumb	NASA Ames Research Center, Moffett Field, CA	
Mr. David Wax	University of Hawaii, THE ALOHA SYSTEM, Honolulu, HI	(808)948-7490

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Wax, David W., "Status Report on UH/ALOHA Participation in the ATS-1 Computer Communications Experiment," *ALOHA SYSTEM Technical Report B74-8*, University of Hawaii, September 1974.

b. Abramson, Norman and Cacciamani, Eugene R., Jr., "Satellite Data Communications," *ALOHA SYSTEM Technical Report B75-14*, University of Hawaii, April 1975; retitled "Satellites: Not Just a Big Cable in the Sky," *IEEE Spectrum*, Vol. 12, #9, Sept. 75.

c. Abramson, Norman, "Packet Switching With Satellites," *ALOHA SYSTEM Technical Report B73-2*, University of Hawaii, March 1973; reprinted in *Proceedings of the National Computer Conference*, June 1973; *Advances in Computer Communications*, (ed.Chu),1974.

d. Abramson, Norman, "Satellite Packet Broadcasting to Very Small Earth Stations," *Proceedings of the PACNET Symposium*, Tohoku University, Japan, August 1975, pp. 101-107; also *ALOHA SYSTEM Technical Report B75-25*, University of Hawaii, July 1975.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

A VHF ground station transmits short-duration data bursts (packets) to the ATS-1 VHF transponder which in turn broadcasts the received signals to all ground stations illuminated by the satellite's antenna. The header of the packet contains addressing information so that only the intended receiving ground station accepts the packet, while all others reject it. Packet transmissions from the ground stations are allowed to occur at random times, so that interferences between packets are possible. Packet error rates due to noise and packet throughput statistics resulting from conflicts are measured for a three-station network. Computers located at the three ground stations provide the capability of a fully-connected digital communications network.

13. OVERALL EVALUATION (Check one) Comments

- [X] a. Very useful; many benefits — First demonstration of satellite packet broadcasting
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

This experiment successfully demonstrated the feasibility of packet broadcasting, using a geosynchronous satellite. This is the first demonstration of packet broadcasting using satellites and the technique is now being tried by ARPA using an INTELSAT IV satellite over the Atlantic Ocean.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

Packet broadcasting via satellite has been shown to be an efficient, flexible means of data communication. The VHF channel used for this experiment is quite noisy by comparison to typical data communication channels but should not be considered representative of high quality satellite communication channels available. Even with the high error rates, throughput is quite effective.

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

Satellite Packet Broadcasting
Data Communications
Packet Broadcasting
Computer Networks

SURVEY FORM FOR ATS USERS

1. NAME: Edward W. Pearl
for T. Theodore Fujita

2. ADDRESS: University of Chicago
SMRP
5734 S. Ellis Avenue
Chicago, Illinois 60637

3. DATE FORM COMPLETED
10-8-75

4. DATE RECEIVED BY UD

049

5. TITLE OF EXPERIMENT:
Utilization of ATS Imagery in Meteorological Analysis

6. NAME/DESIGNATION OF SATELLITE [X] ATS-1 [X] ATS-3 [ ] ATS-5

Date Started 1967 | Date Ended ? Present

7. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. A/C Communications
- [ ] c. Broadcasting
- [ ] d. Data Transmission
- [ ] e. Educational Applications
- [ ] f. Law Enforcement/ Criminal Justice
- [ ] g. Maritime Traffic Control
- [ ] h. Medical/Health Applications
- [X] i. Meteorology
- [ ] j. Navigation
- [ ] k. Voice Communication
- [ ] l. Other _____

8. OBJECTIVE OF EXPERIMENT:

Multifarious objectives:

* Potentially useful as a forecasting tool

(1) cloud and duct tracking
*(2) studies of storm modification
*(3) Computing cloud velocities inferring windspeeds
*(4) Studies of tops of severe local storms
*(5) Inflow and outflow budgets.

9. PARTICIPATING ORGANIZATION — ADDRESS

(NGR-14-001-008)

PARTICIPATING ORGANIZATION	ADDRESS
National Aeronautics and Space Admin.	Goddard Space Flight Center, Greenbelt, MD
National Oceanic & Atmospheric Admin.	World Weather Bldg, Washington, D.C.
National Science Foundation	1800 "G" St., N.W., Washington, D.C. 20550

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Edward Pearl	5734 S. Ellis Ave., Chicago, Ill 60637	(312)753-8114
William Shenk	GSFC, Greenbelt, Maryland	(301)982-5948
Linwood Whitney	NOAA, NESS, MSC, W.W.B., Washington, D.C.	(301)763-812
Eugene W., Bierly	NSF-1800 G St., N.W., Washington, D.C.	(202)634-15

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. T. T. Fujita and J. J. Tecson: A Kinematic Analysis of Tropical Storm Based on ATS Cloud Motions, SMRP Research Paper #125, August 1974

b. (See attachment - copies sent under separate cover)

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

To analyze and understand atmospheric phenomena as seen through ATS imagery -
cloud velocities were measured using the METRACOM method and computed velocities were related to observed windspeeds at various levels
Meso scale features were observed especially those related to severe weather
Overshotting tops of severe thunderstorms were analyzed for evaluation as a future forecasting tool for hail, tornadoes, etc.
Outflow from thunderstorms and hurricanes was studied to infer the dynamics involved
Critical Analysis of the benefits and failures of the first ATS system was performed to improve or change the objectives of future satellite programs.

13. OVERALL EVALUATION (Check one) Comments

- [x] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

Relating cumulus velocities to actual windspeeds in the high and low levels
Correlations of overshooting tops of severe thunderstorms with severe ground events such as hail and tornadoes.
Analysis of meso-scale features and their relation to other features, their growth, and their decay.
Inflow and outflow especially of anvil growth and also for a hurricane situation - clues are obtained as to their meso and synoptic environments.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

There were very strong positive benefits received from the ATS-1 and ATS-3 satellites. For the first time meteorologists were able to view almost on time changes in the meso-scale atmosphere. By utilizing this obvious advantage one could obtain approximate windspeeds in areas where upper level sounding were virtually unavailable. The structure of severe thunderstorms and some of the potential causes of them could be monitored and effectively used. Tropical events could be watched and their budgets analyzed. Most importantly hurricanes could be observed and tracked and changes in their strength were related to observable changes in cloud patterns. Overshooting tops of thunderstorms indicate the severity and possible their potential for producing hail, tornadoes, and heavy rain. Satellites with higher resolution in the visible and infrared will be a further benefit.

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

Clouds
Weather
Cloud Velocities
Dynamical Analysis
Mass Outflow
Inflow
Outflow
Tornadoes
Hail
Meso-Scale
Modification
Tracers
Spinscan, pitch, yaw
Anvil Growth
Overshooting tops, domes, turrets

SURVEY FORM FOR ATS USERS

1. NAME: Roy M. La Rosa

2. ADDRESS: Exxon Corporation
1251 Avenue of the Americas
New York, NY 10020

3. DATE FORM COMPLETED: 9/30/75

4. DATE RECEIVED BY UD

#52

5. TITLE OF EXPERIMENT:
Experimental Evaluation of Maritime Satellite Communications and Position Fixing

6. NAME/DESIGNATION OF SATELLITE ☑ ATS-1 ☑ ATS-3 ☐ ATS-5

Date Started | Date Ended

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☑ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☑ j. Navigation
- ☑ k. Voice Communication
- ☐ l. Other Voice compatibile facsimile Teletype, Slow scan TV

8. OBJECTIVE OF EXPERIMENT:
Determine the capabilities, benefits and applications of Maritime Satellite Communications and Position Fixing. Establish technical and operational user requirements for Maritime Satellite services and ground based user equipment.

9. PARTICIPATING ORGANIZATION | ADDRESS

NASA	Houston, Texas
Exxon Corporation	New York
General Electric Co.	Schenectady, New York

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Roy Anderson	General Electric Co. Schenectady, NY	518-374-2211
David King	Comsat General Corp. Washington, D.C.	202-554-6589

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Roy M. LaRosa; Benefits and Applications of Maritime Satellites, IEEE, EASCON 74, Oct. 1974.

b. Roy M. LaRosa; Roy E. Anderson, Harley E. Hoffman; An Experiment with Maritime Satellite multimode communication and Position Fixing, RTCM April 1974.

c. Roy M. LaRosa, Roy E. Anderson, Harley E. Hoffman; Experimental Evaluation of Satellite Links to Aid ship operations; IEEE International Communications Conference, June 1974.

d. Roy E. Anderson, Harley E. Hoffman, D. W. King, Roy M. LaRosa; Experimental Evaluation of Satellite Communications and Position Fixing for Maritime users, Joint Final Report Exxon Corp and General Electric Co., June 1974.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

This experiment was a joint effort of Exxon Corporation and the General Electric Company to make a comprehensive evaluation of the maritime uses of satellite communications and position-fixing. The National Aeronautics and Space Administration provided the use of two applications Technology Satellites, ATS-1 and ATS-3, for one hour a day of VHF transmission time. The experiment was conducted from July 1973 through February 1974 during which communications messages and ranging signals were exchanged between the ship ESSO BAHAMAS, carrying oil from Venezuela to the U.S. East Coast, and the General Electric station in Schenectady, New York. The ground station relayed these messages to and from the Exxon New York City office over telephone land lines.

The communications modes used were teletype, voice, facsimile and slow-scan TV. They were evaluated with regard to transmission time, quality, operational ease, interconnection factors, application to specific information transfer, value to operating efficiency as well as their adaptability with the internal communication and management techniques used within the Exxon Corporation.

Various constraints on ship-borne equipment that would affect the design of an operational ship satellite terminal were evaluated. The accuracy and reliability of ranging and position fixing from geostationary satellites using the tone-code technique was investigated and data on the factors affecting its accuracy were obtained.

13. OVERALL EVALUATION (Check one) Comments

- [x] a. Very useful; many benefits _____
- [ ] b. Useful _____
- [ ] c. Of some value _____
- [ ] d. No gain from experiment _____

14. ACCOMPLISHMENTS OF EXPERIMENT

1. Determined the priority of Satellite Communication modes.
2. Demonstrated a voice compatible Position Fixing method.
3. Established specific potential benefits to shipping operations.
4. Determined required parameters for ship board and shore based equipment.
5. Established specific applications of satellite communication to shipping operations.
6. Demonstrated to the shipping industry the feasibility of cost effective commercial satellite communications and position fixing.
7. Illustrated the many future potential applications for satellites.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

This experiment lead to Exxon outfitting some ships with the commercial MARISAT system. It illustrated the many potential benefits to shipping operations that satellites could provide. It also again demonstrated the continuing application of space technology, developed over the years by our government, to the improvement of the environment and quality of life on this earth.

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

Satellite Position Fixing, Maritime Satellites, Satellite Communications, Slow Scan TV, Facsimile, Teletype, Voice, Ship Operations.

SURVEY FORM FOR ATS USERS

1. NAME: Carl S. Mathews for Stanley D. Wheatley

2. ADDRESS: Room 4616
Main Commerce Bldg.
Washington, D.C. 20230

3. DATE FORM COMPLETED
September 22, 1975

4. DATE RECEIVED BY UD

051

5. TITLE OF EXPERIMENT:

Maritime Administration Satellite Navigation/Communication

6. NAME/DESIGNATION OF SATELLITE ☐ ATS-1 ☒ ATS-3 ☒ ATS-5

Date Started | Date Ended

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☒ g. Maritime Traffic Control
- ☒ h. Medical/Health Applications
- ☐ i. Meteorology
- ☒ j. Navigation
- ☒ k. Voice Communication
- ☒ l. Other Teleprinter - Facsimile

8. OBJECTIVE OF EXPERIMENT:

Obtain data to support cost benefit study predictions
Validate technical performance
Improve operating efficiency of U.S. Flag Fleet

9. PARTICIPATING ORGANIZATION — ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
All Systems	Moorestown, N.J.
Magnavox	~~Torrance, California~~
U.S. Maritime Coord. Center	Kings Point, New York
U.S. Maritime Administration	Washington, D.C.
General Electric	Schenectady, New York

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
D. Brandel	NASA/GSFC	(301)982-5675

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Final REPORT Eval. of Maritime Satellite Communications for Inland Waterways, G.E. Contract No. 3-36216, January 31, 1973

b. Maritime Satellite Navigation/Communications Program, Phase II, All Systems, Volume I, Executive Summary COM-74-10689

c. Experimental System Description, Volume II, COM-74-10690

d. Experiment Results, Volume III, COM-74-10691

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

See attached

13. OVERALL EVALUATION (Check one) Comments

- [x] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

See attached

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

See attached

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

Maritime Satellite Communications/Navigation
MARISAT Fleet Management
Optimal Routing
Navigation
Integrated Communications/Navigation
SOIS
Ship Operation Information System
Ship Automation Collision Avoidance
Maritime Coordination Center

SURVEY FORM FOR ATS USERS

1. NAME:
AERONAUTICAL RADIO, INC. (ARINC)

2. ADDRESS:
2551 Riva Road
Annapolis, Maryland 21401

3. DATE FORM COMPLETED
26 September 1975

4. DATE RECEIVED BY UD
27 August 1975

#52

5. TITLE OF EXPERIMENT: ARINC/AIRLINE INDUSTRY VHF COMMUNICATIONS EXPERIMENT

6. NAME/DESIGNATION OF SATELLITE ☒ ATS-1 ☒ ATS-3 ☐ ATS-5

Date Started 9 December 1966 | Date Ended July 1968

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☑ b. A/C Communications
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☒ k. Voice Communication
- ☐ l. Other _____

8. OBJECTIVE OF EXPERIMENT: To evaluate the effectiveness of VHF communications using synchronous satellites. Specifically, the program was designed to (1) determine the technical characteristics of an operational satellite air/ground/air communications system applicable to voice and data and (2) verify that the application of satellites to the VHF aeronautical mobile environment is practicable as regards spacecraft and avionic equipment, including aircraft antennas.

9. PARTICIPATING ORGANIZATION — ADDRESS

AIRLINE PARTICIPANTS:

American Airlines, Eastern Airlines,
Japan Airlines, Pan American World Airways,
Qantas Empire Airways, Trans World Airlines,
United Airlines

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Bendix Avionics Division	Hughes Space Systems Division	
The Boeing Company	Japanese Radio Research Laboratory	
Canadian Department of Transport	McDonnell-Douglas Corporation	
Collins Radio Company		
Dorne & Margolin, Inc.		

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. AERONAUTICAL RADIO, INC. - ARINC/AIRLINES SATCOM PROGRAM
Summary of 1967 Activities & Technical Data

b. Hughes Aircraft Company - ATS VHF Performance
December 1967/SSD 70514R

c. Chronological History of Airline Satellite Communications
Testing with the NASA Applications Technology Satellites ATS-1 & ATS-3

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

SPACECRAFT - Both ATS-1 & ATS-3 had nearly identifical VHF repeaters. Both utilized active frequency translation repeaters receiving at a frequency of 149.22 MHz & transmitting at 135.0 MHz. The major system parameters are provided in the technical report listed in 11(b) above.

AIRCRAFT - For the communications test, equipment contained one transceiver, 500 watt power amplifier, signal source tape playback unit, low noise pre-amplifier & a two-channel tape recorder. For the propagation and data transmission test, aircraft equipment contained two transceivers, a transmitting power amplifier, FM Modem/Adaptor, a 14-track analog instrumentation recorder, monitoring equipment, teletypewriter conversion modules, teleprinter, and a time code generator.

ANTENNAS - Three developmental antennas were used as follows: Dorne & Margolin DM C33-2, Bendix ANA-42-A and a Boeing Wing-Fillet Slot Antenna. Peference technical report described above (11a).

13. OVERALL EVALUATION (Check one)

- [X] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

Comments

The test philosophy which evolved was to evaluate the channel capability in terms of probability of successfully communicating & making measurements of those signal parameters which would have the greatest effect on the system design margin.

14. ACCOMPLISHMENTS OF EXPERIMENT

The ATS Satellite proved conclusively the feasibility of using synchronous satellites for VHF aeronautical communications applications.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

The availability of a Very High Frequency (VHF) experiment in two Applications Technology Satellites (ATS) offered the airline industry an opportunity to determine the feasibility of and to obtain the data necessary to establish an air/ground/air communication link employing satellite relay.

Based on the result of these evaluations, the airline industry was assured that the state-of-the-art provided for reliable and efficient use of the VHF Band for aeronautical communications services provided via satellite relay in the major oceanic areas. Accordingly, efforts were made with appropriate government agencies to provide this service for both air traffic control and airline operational control functions.

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

- Frequency Assignments and Channel Utilization
- Minimum EIRP Per Channel
- Multipath Fading
- Propagation Effects
- Aircraft/Satellite/Ground Transmission Link
- Aircraft Position Determination
- Dedicated Channels for ATC and Operational Control Applications
- VHF Repeater

SURVEY FORM FOR ATS USERS

1. NAME: University of the South Pacific	3. DATE FORM COMPLETED: October 26, 1975
2. ADDRESS: Laucala Bay Box 1168 Suva Fiji	4. DATE RECEIVED BY UD

#453

5. TITLE OF EXPERIMENT:

University of the South Pacific Satellite Communication Project

6. NAME/DESIGNATION OF SATELLITE ☑ ATS-1 ☐ ATS-3 ☐ ATS-5

Date Started	Date Ended

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☒ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☐ l. Other _____

8. OBJECTIVE OF EXPERIMENT:

a. To determine applicability of two-way voice communication in the Extension Services programme of the University of the South Pacific
b. To identify effective uses of such a link:lectures, seminars,tutorials, etc.
c. To compare cost effectiveness of satellite line with other modes of communication; estimate time requirements for each communication use.

9. PARTICIPATING ORGANIZATION / ADDRESS

USP Centre	Honiara, Solomon Islands
Education Centre	P.O.Box 22, Vila Vila
Nawemi Training College	Port Vila,New Hebrides
USP Centre	Satellite,Cook Islands Govt.,Rarotonga
USP Centre	Box 275,Bikenibeu Tarawa Gilbert Is.
USP Centre	Nukualofa,Tonga

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
John Bystrom	University of Hawaii	948-7848

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. July 1,1975 Submission,Gilda Denstead,Peter McMechan

b. Denstead,Northcott,McMechan, Satellite Communication Project-Year I

c. McMechan - Teaching by Satellite:Pacific Islands join in Experimental project

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT
Six Experimental Areas:

I. USP External Classroom
II. Curriculum Development
III. Continuing Education
IV. Information Exchange
V. Peacesat
VI. Multi-System links.

See NASA proposal, July 1975, page 3.

13. OVERALL EVALUATION (Check one)

Comments

- [X] a. Very useful; many benefits — has become an integral and vital part of Extension services
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

a. Unification of a Regional University experience by means of a satellite communication system.

1. The daily satellite link enabled USP to implement programmes, maintain on-going commitments, and have rapid solutions to daily concerns. The satellite communication program eleminated problems of isolation and communication delays.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

a. The satellite communication project enabled USP to unify and consolidate its Regional Services. Without the link, problems of communication delay would have been overwhelming.

b. Technical problems are still being overcome: 1) low transmitted power. 2) frequency instability, 3) operator difficulties. See page 7 1975 submission and page 22 1974 report.

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

Vital
experimental
involvement
unifying
expanding
significant
rapid
routine
credibility
design
on-going
supportive
service
integral

SURVEY FORM FOR ATS USERS

1. NAME: State of Alaska
Governor's Office of Telecommunications

2. ADDRESS: _____

3. DATE FORM COMPLETED
August 5, 1975

4. DATE RECEIVED BY UD
August 20, 1975

054

5. TITLE OF EXPERIMENT:

Health/Education Telecommunications Experiment - Alaska Education

6. NAME/DESIGNATION OF SATELLITE [X] ATS-1 [ ] ATS-3 [ ] ATS-5

Date Started 9/5/74 | Date Ended 5/13/75

7. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. A/C Communications
- [ ] c. Broadcasting
- [ ] d. Data Transmission
- [X] e. Educational Applications
- [ ] f. Law Enforcement/ Criminal Justice
- [ ] g. Maritime Traffic Control
- [ ] h. Medical/Health Applications
- [ ] i. Meteorology
- [ ] j. Navigation
- [ ] k. Voice Communication
- [ ] l. Other _____

8. OBJECTIVE OF EXPERIMENT:

Operation of an experimental satellite system to give Alaska experience from which to plan statewide satellite communications system.

9. PARTICIPATING ORGANIZATION ADDRESS

State of Alaska/Governor's Office of Telecommunications
NIE/HEW: Corporation for Public Broadcasting:
University of Alaska/KUAC-TV:
Northwest Regional Educational Laboratory

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Charles Northrip	Satellite Experiment Coordinator	
Rex Taylor	Education Experiment Manager	
Ted McIntire	Technical Manager	
Catalino Barril	Utilization Manager	

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Kenneth A. Polcyn, An Educator's Guide to Communication Satellite Technology, 9/73

b. J. Russell Burke and Frank W. Norwood, "Satellite Developments and the ATS-6" Audiovisual Instruction, Vol. 20, No. 5, May 1975.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

Supervised by the Governor's Office of Telecommunications, the Alaska Education component of the Health/Education Telecommunications experiment was funded by the National Institute of Education/HEW. Low-cost earth terminals were installed at 19 Alaskan sites with equipment provided by HEW. With a two-year budget of $1.7 million, GOT supervised the design and production of 80 hours of Instructional Programming on Health Education (Right On!, for 8-10 year olds), Basic Oral Language Development (Amy and the Astros, for 5-7 year olds), and Viewer-Defined Programming Alaska Native Magazine, for adult Native Alaskans). During broadcast, ATS-1 provided direct VHF link with all sites. System testing over ATS-6 began 9/5/74. Program broadcasting began 10/7/74 and was completed 5/13/75.

USER REACTION

User reaction varied with each program and terminal site. Some rural teachers utilized the programs consistently, some did not. At several locations placement of the viewing monitor resulted in the wrong age level watching programs designed for younger children, and attention wavered. Many sites reported enthusiastic response by children, some considered the shows too basic for their classes. Sites also reported that students' attention wandered during the interaction segments of programming, although they responded when their village was directly asked a question. The use of students drawings and photographs during broadcasts greatly heightened interest.

(Cont'd.on separate page)

13. OVERALL EVALUATION (Check one)

- [x] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

Comments

The experiment provided invaluable first-hand experience to the State of Alaska for future planning in meeting the priority of establishing a cost-effective and practical communications network for isolated Alaskan communities.

14. ACCOMPLISHMENTS OF EXPERIMENT

Fourteen receive- only and five receive and transmit terminals were installed in widely scattered Alaskan sites. All Instructional Programming designs by the contracted educational design agency were guided and approved by consumer committees, made up of community-selected receiving site residents. A consumer committee worked directly with the contracted production facility to design all Viewer-Defined Programming. Part-time utilization aides were hired at each terminal site to operate equipment, collect data and encourage participation. Instructional programs were available to 1200 rural school children (K-5th grade), and 150 rural educators. Viewer-Defined Programming was accessible to 9,000 Alaskan village residents, as well as 50,000 urban residents. Experimentation included two-way interaction and translated broadcasts.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

Alaskan rural users were involved in planning programming relevant to their needs. The experiment provided valuable experience in coordinating design and production agencies, as well as with participating state agencies. The technical and management experience gained by the state resulted in detailed recommendations for future satellite network planning.

The entire experiment was performed on a tight accomplishment time frame, further tightened by federal funding uncertaintities. This project provided Alaskan villages with new services on only a short-term basis, a familiar occurence in rural Alaska, which may have affected participation. Interaction via ATS-1 was of poor audio quality, plagued by interference, which hindered full user utilization.

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

Unique Experiment
First-Hand Demonstration in Satellite Operation
Opportunity to Explore Potentials of Satellite Network to Meet Communications Needs Imposed by Alaska's Rugged Terrain, Harsh Climate and Sparse Population.
Model to Gauge Appropriateness of Satellite Communications for Instructional Purposes.
Consumer-Designed Programming
User Input and Reaction Created Relevant Program Content
Interaction With Users During Broadcast

12. DESCRIPTION OF EXPERIMENT (Cont'd.)

Alaska Native Magazine was most enjoyed when a program concerned topics or villages familiar and important to adult viewers. Attendance declined due to conflicting village activities and "too much talk." Use of on-location footage and less studio discussion seemed to improve response as the program progressed.

Use of interaction via ATS-1 was sporadic. Some sites responded consistently, some seldom, if ever, responded. Placement of viewing monitors in the schools at many sites hindered adult attendance. The simultaneous audio channels providing translations of pre-taped program content were not frequently used.

Consumer committee members responsible for program design were consistently enthusiastic about the project, remained active and took their responsibilities seriously. The utilization aides hired at each terminal location performed satisfactorily, although all data was not returned consistently by all. Publicity efforts within each village were not successful when the aides were personally out-going individuals.

POLITICAL FACTORS

The greatest political factor positively affecting the experiment was the State of Alaska's firm commitment to telecommunications planning. In early 1973, planning supervision of the HET experiment shifted from the Alaska Educational Broadcasting Commission to the newly created Office of Telecommunications, both within the Governor's Office. This shift resulted in a scaled-down proposal acceptable to federal funders, limiting the number of Alaskan sites and thus decreasing the federal funding request. The state's commitment to the experiment was based on a variety of in-state factors, principally political pressure from legislators and Native regional corporations for state planning of an effective rural communications system. With funding uncertaintities on the federal level during the summer and fall of 1974, the state's commitment prevailed in accepting a level of funding lower than originally anticipated, while maintaining the project in its basic concept and design.

SURVEY FORM FOR ATS USERS

1. NAME: [illegible]

2. ADDRESS: [illegible]

3. DATE FORM COMPLETED: [illegible] Sept. 1975

4. DATE RECEIVED BY UD

055

5. TITLE OF EXPERIMENT: PEACESAT
(Pan Pacific Education and Communication Experiment by Satellite)

6. NAME/DESIGNATION OF SATELLITE ☒ ATS-1 ☐ ATS-3 ☐ ATS-5

Date Started December 1971 Date Ended [illegible]

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☒ c. Broadcasting
- ☐ d. Data Transmission
- ☒ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☒ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☒ k. Voice Communication
- ☒ l. Other Interactive Multilateral International Broadcasting

8. OBJECTIVE OF EXPERIMENT: Applications of satellite interactive multilateral international broadcasting in all fields

9. PARTICIPATING ORGANIZATION ADDRESS

Many educational, health, community groups, Government Departments news media take part in continuing experimental projects

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
[illegible]	[illegible]	
[illegible]	[illegible]	
[illegible]	[illegible]	
[illegible]	[illegible]	
[illegible]	[illegible]	

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a.

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

13. OVERALL EVALUATION (Check one)

Comments

- [X] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

[illegible] many 'firsts' [illegible] [illegible]

The series of the Gillingham Project Bulletin will give some idea of the range and scope of experiments, which have been proceeding at this intensive level for several years. Many of these could be regarded as significant events locally or separately, direct all area of 'public participation' in outside

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

This most important project made possible by NASA has paradoxically had a continuing struggle for survival and has always laboured under the uncertainties of short term [illegible] with approvals, with consequent serious difficulties in obtaining local support and project funding.

The survival of the project under these conditions has been a remarkable feat.

ORIGINAL PAGE IS
OF POOR QUALITY

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment) [illegible] for [illegible] evaluation form [illegible].

[illegible] [illegible] [illegible] [

SURVEY FORM FOR ATS USERS

1. NAME: W. C. DALE	3. DATE FORM COMPLETED: 2 / 5 / 75	056
2. ADDRESS: New Dept of Scientific + Industrial Research NZ Private Bag WELLINGTON, NZ	4. DATE RECEIVED BY UD	1 to 6

5. TITLE OF EXPERIMENT:
U. of HAWAII PEACESAT PROJECT

6. NAME/DESIGNATION OF SATELLITE ☑ ATS-1 ☐ ATS-3 ☐ ATS-5

Date Started July 1972 | Date Ended Nov 1972

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☑ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☑ k. Voice Communication
- ☑ l. Other AGRICULTURAL INFORMATION

8. OBJECTIVE OF EXPERIMENT:
INFORMATION EXCHANGE IN AGRICULTURE

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
MINISTRY AGRICULTURE + FISHERIES	P O Box 2298 WELLINGTON N/Z

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
W. P. Thompson	M. Ag. + Fish P. 2298 Wellington N.Z.	
Not. will be no longer employed by MAF who had asked		
	as primary contact + coordinator	

056

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Review of Peacesat Agricultural Seminars July - Nov 1972 (Report to Applications Advisory Services Division) in 1973 PEACESAT PROJECT REPORT TO NASA as Evaluation Report 10. Nov 1972 Vol 3

b.

c.

d.

e.

f.

Peacesat Project Report to NASA

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

Monthly links for problem solving and extension of technical information on a wide range of agricultural topics within the Peacesat link.

13. OVERALL EVALUATION (Check one)

Comments

- [x] a. Very useful; many benefits — Many useful continuing contacts
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

1 New Personal contacts which provided new information and literature exchange.

2 Stimulus to recipients

3 Provision of reference people within region (S W Pacific especially)

4 Training in skills of voice communication.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

Weaknesses - occasional break down of equipment
- lack of continuity of some participants
- failure of some participants to take part (occasionally)

Strengths - direct answers to questions
- discussion summaries provided written review of subjects
- opportunity to make specialist staff available to wide region
- stimulus to isolated workers, devoid of contacts or data.

Strongly support continuation, evolution modification + evaluation of Peasant approach

16. KEYWORDS
(Please enter as many keywords as you feel are appropriate to describe your experiment)

INFORMATION
EXCHANGE
AGRICULTURE

SURVEY FORM FOR ATS USERS

1. NAME: Jim Richstad

2. ADDRESS: East-West Center
1777 East-West Road
Honolulu, Hawaii 96822

3. DATE FORM COMPLETED: 9/26/75

4. DATE RECEIVED BY UD

051

5. TITLE OF EXPERIMENT:

(A) Press Conference of the Pacific (B) Agricultural Information Officers Follow Up

6. NAME/DESIGNATION OF SATELLITE ☒ ATS-1 ☐ ATS-3 ☐ ATS-5

Date Started (A) mid-1973 (B) April 1974 | Date Ended (A) mid-1973 (B) April 1974

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☒ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☐ l. Other _____

8. OBJECTIVE OF EXPERIMENT:

(A) Test feasibility of public affairs discussion in press conference format.

(B) Test feasibility of using PEACESAT system to "extend" workshop training held in Honolulu several months earlier.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
East-West Communication Institute	see #2

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Numerous persons in the Pacific Islands--Fiji, Tonga, Western Samoa, American Samoa, Papua New Guinea, Cook Islands		

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. (A) Richstad, Jim, "Press Conference of the Pacific," paper for Users of Peacesat Conference," East-West Center, 1975.

b. (B) No formal report available.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENT

(A) Covered in attached paper.

(B) Workshop participants joined in exchange over radio satellite and discussed experiences since workshop: What have you implemented in workshop project, What most useful about workshop, Would you like to continue to meet over PEACESAT?

13. OVERALL EVALUATION (Check one)

(A) (B) ☐ a. Very useful; many benefits
(A) (B) ☒ b. Useful
(A) (B) ☐ c. Of some value
(A) (B) ☐ d. No gain from experiment

Comments

Format testing was very useful, actual conduct useful. Obviously need more work on both.

14. ACCOMPLISHMENTS OF EXPERIMENT

(A) See attached paper.

(B) Determined felt need to remain in contact with other participants; allowed instructors to evaluate directly with participants after they returned home.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

(A) See attached paper.

(B) This seems to be a particularly useful form for EWC Pacific Island projects. Logistics of getting everyone together difficult.

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

(A) News conference format test over international audio satellite system in news-scarce areas.

(B) Followup to Agricultural Information Officers Workshop over international audio satellite.

SURVEY FORM FOR ATS USERS
(BASIC DATA)

I. D. Number 4-3
Page 1 of 2

1. IDENTIFICATION a. I. D. Number b. Your Name	2. DATE MAILED	3. DATE COMPLETED	4. DATE RECEIVED BY U. D. 12 Sep 75

5. a. Title of Experiment PEACESAT (Pan Pacific Education and Communication Experiments by Satellite) Project

b. Date Started December 1970 | c. Date Ended ongoing

6. SUBJECT CATEGORY (check one)

- ☐ a. Air Traffic Control
- ☐ b. Aircraft Communications
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☒ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice Applications
- ☐ g. Maritime Traffic Control
- ☒ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ k. Voice Communication
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT Determine effective application of low cost satellite system to assist educational & professional services in remote, less developed areas by internation sharing of resources.

8. NAME OF PARTICIPATING ORGANIZATION(S); put your organization first if more than one

PEACESAT (Pan Pacific Education and Communication Experiment by Satellite) Project

9. NAMES OF PARTICIPATING INDIVIDUALS (Your organization; give managerial/technical titles)

Name	Title	Name	Title
John Bystrom	Director		Physicist
	Chief Scientist/ Principal Investigator		
Tony Hanley	Associate Director		

10. a. CONTACT PERSON FOR PERSONAL INTERVIEW
John Bystrom
Phone: (808) 968-8848

b. ALTERNATE
Tony Hanley
Phone: (Wellington Polytechnic, N.Z.)

11. GEOGRAPHIC AREA (check as appropriate)

- ☐ a. ALASKA
- ☐ b. NORTHEASTERN U.S. (Washington, D.C. to Maine; Pennsylvania)
- ☐ c. SOUTHEASTERN U.S. (Florida to Virginia; east of Mississippi)
- ☐ d. MIDWESTERN U.S. (Ohio to Nebraska; Texas to N. Dakota; Minnesota
- ☐ e. NORTHWESTERN U.S. (Montana to Washington)
- ☐ f. SOUTHWESTERN U.S. (Colorado to California
- ☑ g. HAWAII
- ☐ h. CANADA
- ☐ i. UNITED KINGDOM
- ☐ j. EUROPE
- ☐ k. JAPAN
- ☐ l. SOUTH AMERICA
- ☒ m. Pacific Basin and Asian Rim

12. CONTRACT NUMBER(S)/GRANT NUMBER(S) No federal funds used

13. TECHNICAL REPORTS/JOURNAL ARTICLES (List by author, title, technical report number or journal citation, date)

SEE ATTACHMENT

a. _____

b. _____

14. DESCRIPTION OF EXPERIMENT PEACESAT is an experiment in interconnecting selected educational and public institutions in the Pacific Basin by communication satellite relay. Over a dozen locations widely separated geographically, and experiencing varying degrees of industrialization, are linked together daily for two-way communication. General categories of use include professional and in-service training, decision-making conferences, classroom instruction, community development seminars, information transfer, and diagnostic and research medical consultation.

15. ACCOMPLISHMENTS

First use of international educational satellite system in the world.
First use of low-cost ground terminal in a satellite system.
First class for credit to be taught via satellite in the world.
First satellite library network in the world.
Demonstrated the feasability and workability of design and application of low cost, two-way ground terminal for social development purposes.
First intra-state satellite system in the United States.

16. OVERALL EVALUATION (Check one)

- [X] a. Very useful; many benefits
- [ ] b. Useful
- [ ] c. Of some value
- [ ] d. No gain from experiment

Comments

Pacific Basin governments, funding agencies, and educational and health institutions have indicated by their continued support and increased use of ~~the system that the two way, information~~ sharing approach is desirable.

17. STATEMENT OF OPINION (Please summarize; give positive and negative aspects and value to you)

The PEACESAT demonstration has served as an intercontinental laboratory for the simultaneous testing and application of low cost, multiple purpose satellite ground terminals. As the system developed, technical standards and operational reliability were upgraded as user communication requirements increased and also became more diverse. Through continuous, daily experience, information was made available on the technical, political, legal, and social aspects involved in the operation of a satellite experiment which crosses national boundaries and encompasses different economic and cultural environments.

18. KEYWORDS (Please enter as many keywords as you feel are appropriate to describe your experiment)

International, experimental, networks, cross-cultural, local funding, education, health, community development, two-way dialogue, wide coverage, high power satellite, low cost equipment, multi-lateral decisions, involvement planning, Pacific Basin.

ATTACHMENT

1. Auburn, F.M. "Report on an Experiment in the Teaching of Law by Satellite," Jurimetrics Journal; Vol. 14, No. 3; Spring 1974.

2. Benstead, G., Northcott, D., and McMechan, P. "Report for the First Experimental Year," University of the South Pacific Extension Services; April 1975.

3. Byers, B. "PEACESAT and Education in the Pacific Basin," Report to Western Speech Communication Association; Fresno, California; November 1971.

4. Bystrom, J. "The PEACESAT Project," Report to International Communication Association; April 1972.

5. Bystrom, J. "Supplemental Evaluation Report: PEACESAT," VOL I & II; Report to NASA; August 1973.

6. Bystrom, J. "Satellite Communication Applied to the Needs of Developing Areas: The PEACESAT Experiment" Report to the International Conference on Computer Communication," Stockholm; August 1974.

7. Bystrom, J. "The PEACESAT Project: Telecommunications and International Development in Health and Education," Report to the Fifth Annual Eurospace Conference; San Francisco; May 1972.

8. Bystrom, J. "Increasing Intercultural Communication· The PEACESAT Experiment, A Study on the Social Benefits of International Interactive Exchange by Communication Satellite," International and Intercultural Communication Annual, Vol 1; December 1974.

9. Bystrom, J. "The Application of Satellites to International Interactive Service Support Communication," Royal Society of London; H44528 RPA. (1975)

10. Callison, George T. "PEACESAT: Communication Satellite for Micronesia," Micronesian Reporter; Fourth Quarter, 1974.

11. Cutting, A. and Berkowitz, D. "PEACESAT: A Report on the Progress of an Experiment," University of the South Pacific, Suva, Fiji; 1973.

12. Hanley, A. "The Wellington Polytechnic Satellite Communication Programme," New Zealand Engineering, Vol. 28; pp. 162-65; June 1973.

13. Hanley, A. "The PEACESAT Project: A Report to the AID Conference on Use of Satellites for Education and Development," Denver, Colorado, May 1974.

14. Kunimoto, E. "Speech-Communication Instruction by Satellite," Report to the Speech Communication Association; San Francisco; December 1971.

15. Misko, C. "Explorations in Intercultural Exchange by Satellite," Report to the International Communication Association; New Orleans; April 1974.

16. Misko, C. "PEACESAT: International Exchanges by Satellite," Report to the Wisconsin Conference on Applications of Satellites and Cables," Madison, Wisconsin; June 1975.

17. Nadai, S. "Performance by Satellite of Native and Non-native Speakers of English," Report to the International Communication Association; December 1971.

18. Nose, K. "Using the ATS-1 Weather Satellite for Communications," QST, Vol IV, No. 12; December 1971.

19. Seumahu, E.S. "Departmental Report - 4/8/74: Satellite Communication Project," Papua New Guinea University of Technology; July 1974.

20. Hanley, A. "Small Earth Terminals for Satellite Communications Systems," A Report to New Zeland Electronics Conference; August 1975.

SURVEY FORM FOR ATS USERS

1. NAME: Dr. Elizabeth C. Hunstgate

2. ADDRESS: 1504 Ulupa St.
Kailua, Hawaii 96734 (home)
Communication Program, University of Hawaii at Manoa Honolulu, HI. 96822 (professional)

3. DATE FORM COMPLETED: 8-27-75

4. DATE RECEIVED BY UD: 9/2/75

5. TITLE OF EXPERIMENT:
BUILDING INTERPERSONAL RELATIONSHIPS VIA SATELLITE COMMUNICATION or
CREATING LEARNING CONTEXTS VIA SATELLITE COMMUNICATION

6. NAME/DESIGNATION OF SATELLITE ☒ ATS-1 ☐ ATS-3 ☐ ATS-5

Date Started June, 1971 to August, 1971 Date Ended June, 1973 to August, 1973

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. A/C Communications
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☒ e. Educational Applications
- ☐ f. Law Enforcement/ Criminal Justice
- ☐ g. Maritime Traffic Control
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☒ k. Voice Communication
- ☐ l. Other _____

8. OBJECTIVE OF EXPERIMENT:

June-August,1971: to build interpersonal relationships by means of voice communication among students separated geographically so as to accomplish (1) information gain and (2) attitude change.
June-August, 1973: a replication on a smaller scale of the foregoing.

9. PARTICIPATING ORGANIZATION / ADDRESS

PARTICIPATING ORGANIZATION	ADDRESS
University of Hawaii - Hilo Campus	Hilo, Hawaii
Wellington Polytechnic	Wellington, New Zealand

10. Other Persons Involved in Experiment that Should Be Contacted

NAME	ADDRESS	PHONE
Dr. Burton Bryce	Communication Program, University of Hawaii	948-7644

11. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number or journal citation, date)

a. Kunimoto, Elizabeth, "Speech-Communication Instruction by Satellite," paper presented at the Speech Communication Association national convention on December 28, 1971.

b.

c.

d.

e.

f.

*Please send copies of the above items as available

12. DESCRIPTION OF EXPERIMENTS

1. The first "classroom" interchange between two classes, one located in Honolulu and the other, in Hilo. Behavioral objectives were information-gain and attitude change. The interchanges lasted throughout the summer session. Students were able to demonstrate significant information gain and attitude change even though they were apart geographically; i.e., there was no significant difference in either information gain or attitude change between groups who communicated by voice alone by means of satellite and those who communicated face-to-face in the same classroom. The students utilized activities dealing with panel-member self-identity before taking part in the activities dealing with information-gain and attitude change.

2. The second interchange occurred two years later between a group from the University of Hawaii and Wellington Polytech. This was a replication of the major aspects of the earlier experiment in information gain.

13. OVERALL EVALUATION (Check one) Comments

- ☐ a. Very useful; many benefits
- ☐ b. Useful
- ☐ c. Of some value
- ☐ d. No gain from experiment

14. ACCOMPLISHMENTS OF EXPERIMENT

1. [illegible] communicated by voice alone by means of satellite [illegible] such [illegible] and also influenced one another as much as those who communicated face-to-face.

2. The replication, which took place between students of Hawaii and New Zealand, revealed that intercultural communication by means of voice alone is feasible.

15. STATEMENT OF OPINION (Summarize: give positive and negative aspects)

1. In the 1971 experiment there was a great deal of preparation "off-the-air." This preparation, dealing with substantive matters as well as supportive matters such as paralanguage and word intelligibility, aided greatly in the success of the experiment.

2. The 1973 experiment was successful but not to the degree of the earlier experiment because of the minimal preparation prior to the interchange.

16. KEYWORDS

(Please enter as many keywords as you feel are appropriate to describe your experiment)

[illegible] classroom [illegible]

SURVEY FORM FOR ATS USERS

1. NAME: DR. KENNETH A. POLCYN

2. ADDRESS: We were going to use the ATS-6 but decided to use a U.S. Navy satellite instead; therefore the information desired cannot be provided by us.

3. TITLE OF EXPERIMENT:

4. DATE STARTED: DATE ENDED:

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☐ ATS-6 ☐ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☐ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT:

8. PARTICIPATING ORGANIZATION: ADDRESS:

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a.

b.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

SURVEY FORM FOR ATS USERS

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☐ No

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☐ Yes ☐ No

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

SURVEY FORM FOR ATS USERS

1. NAME: James L. Baker

2. ADDRESS: 4 Beach Drive
Sherwood Forest, MD 21405

3. TITLE OF EXPERIMENT: 1) Search & Rescue and Boat Tracking; 2) Digitized Message transmission from Sailboat; 3) Long distance voice/mobile communication from Sailboat to Japan via ATS-1.

4. DATE STARTED: DATE ENDED:

5. SATELLITE DESIGNATION: [X] ATS-1 [X] ATS-3 and NIMBUS-6 [ ] ATS-5 [ ] ATS-6 [ ] CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. Maritime Traffic Control
- [ ] c. Broadcasting
- [ ] d. Data Transmission
- [ ] e. Educational Applications
- [ ] f. Law Enforcement
- [X] g. Communications
- [ ] h. Medical/Health Applications
- [ ] i. Meteorology
- [x] j. Navigation
- [x] l. Other Search & Rescue

7. OBJECTIVE OF EXPERIMENT: to determine feasibility of using low earth orbit to track sailboat continuously; to talk over commercially available transever to Japan from the Bahamas.

8. PARTICIPATING ORGANIZATION: / ADDRESS:

PARTICIPATING ORGANIZATION:	ADDRESS:
Van Houten Sailboat	199 Ocean Lane Drive, Apt. 401, Key Biscayne
Goddard Space Flight Center	Greenbelt, MD
University of Miami (Paul Eaden	Biscayne Bay, Miami
G. E. Observatory	Schenectady, NY
Kashima Ground Station	RRL Ibaraki Ken, Kashima Machi, Hirai, Japan

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
Richard S. Woll	1200 J. Gemini Drive	301-263-0526
Paul Eaden	University of Miami	305-350-7271
Ross Louis Van Houten	199 Ocean Lane Dr., Apt. 401 Key Biscayne, Florida	-446-8621

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a.

b.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

SURVEY FORM FOR ATS USERS

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No

Too expensive; too much trouble to coordinate approvals

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No

Lots of people would want to have one for their boat for safety, to send messages, report weather information.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

Launch more communications satellites

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

Voice and data ground retrieval and transmission and storage on disc or tape; more frequency bands and much more cross-strap capability for mobile users.

SURVEY FORM FOR ATS USERS

JUL 21 REC'D

1. NAME: Mountain States Health Corporation

2. ADDRESS: 3100 Henderson Drive
Cheyenne, Wyoming 82001

3. TITLE OF EXPERIMENT: EMT Satellite Refresher Training Course

4. DATE STARTED: March 15, 1975 DATE ENDED: May 10, 1975

5. SATELLITE DESIGNATION: ☐ ATS-1 ☒ ATS-3 ☐ ATS-5 ☐ ATS-6 ☐ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☒ e. Educational Applications
- ☐ f. Law Enforcement
- ☐ g. Communications
- ☒ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT: To provide refresher training to Emergency Medical Technicians in 34 rural areas in eight Rocky Mountain States

8. PARTICIPATING ORGANIZATION: ADDRESS:

Federation of Rocky Mountain States	2480 W. 26th Ave. Denver, Colorado 80211
Rocky Mountain Public Broadcasting Network	2480 W. 26th Avenue, Denver, Colo. 80211
Robert Wood Johnson Foundation	Forrestal Center, P.O. Box 2316, Princeton New Jersey, 08540

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. Final report submitted to the Robert Wood Johnson Foundation

b.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

Resfresher training provided to over 400 Emergency Medical Technicians in 34 sites in eight states. Because of the shortage of medical manpower, the sparse population and vast distances the individuals who participated in this program would have otherwise not been able to access this material.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

Postive:
1) Demonstrated the capabilities of delivering vital information via communications satellite.
2) Provided vitally needed training to over 400 emergency medical technicians who would not otherwise be able to access such material.

C-3

SURVEY FORM FOR ATS USERS

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No

Lack of available financial support at the present time.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

1) Begin planning for a second public service communications satellite.
2) Developing earth terminals that would be available to approved experimenters.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

1) Access to a public service satellite (multiple video and audio capability) on a shared basis.
2) Availability of earth receiving terminals for approved experimenters.

2-005 was returned blank from Dr. Edward Buckley of NAFEC, Atlantic City, New Jersey.

SURVEY FORM FOR ATS USERS

1. NAME: J. R. Winckler

2. ADDRESS: School of Physics
University of Minnesota
Minneapolis, Minn. 55455

3. TITLE OF EXPERIMENT: Eme-Electron-Proton Spectometer

4. DATE STARTED: 1964 DATE ENDED: Not Ended

5. SATELLITE DESIGNATION: [X] ATS-1 [ ] ATS-3 [ ] ATS-5 [X] ATS-6 [ ] CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. Maritime Traffic Control
- [ ] c. Broadcasting
- [ ] d. Data Transmission
- [ ] e. Educational Applications
- [ ] f. Law Enforcement
- [ ] g. Communications
- [ ] h. Medical/Health Applications
- [ ] i. Meteorology
- [ ] j. Navigation
- [X] l. Other Radiation Environment and Basic Magnetospheric Research

7. OBJECTIVE OF EXPERIMENT:

Measure electrons and protons in trapped radiation and determine origin. Evaluate spacecraft environment and radiation dose.

8. PARTICIPATING ORGANIZATION: ADDRESS:

See 2. Above

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
Prof. R. W. Arnoldy	U. of New Hampshire	
	Durham, NH	

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a.

b.

c. ENCLOSED

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

ENCLOSED

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

SEE REPRINT ON ATS-6 ENCLOSED

SURVEY FORM FOR ATS USERS

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☒ Yes ☐ No if possible.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☐ Yes ☐ No

Indirectly- radiation damage is severe in this region of space. Must be studied. Also must understand plasma environment of space.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

Provide more ATS missions for basic purposes.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

Like ATS-1, 5, 6 these were O.K.

JUL 22 REC'D

SURVEY FORM FOR ATS USERS

1. NAME:
Professor R. A. Helliwell - Adjunct Professor J. P. Katsufrakis

2. ADDRESS: Radioscience Laboratory
Durand Building
Stanford University
Stanford, California 94305

3. TITLE OF EXPERIMENT:
VLF WAVE INJECTION INTO THE MAGENTOSPHERE FROM SIPLE STATION, ANTARCTICA

4. DATE STARTED: 1 March 1977 DATE ENDED: Continuing

5. SATELLITE DESIGNATION: ☐ ATS-1 ☒ ATS-3 ☐ ATS-5 ☐ ATS-6 ☐ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☐ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☒ l. Other Real time operation between Roberval, Quebec, Canada and Siple Station, Antarctica of the VLF Wave Injection Experiment

7. OBJECTIVE OF EXPERIMENT:
A Wave-particle and wave-wave interaction experiment whose objective is to artificially stimulate VLF emissions and to scatter and precipitate out the energetic electrons involved in the interaction.

8. PARTICIPATING ORGANIZATION: ADDRESS:

Stanford University — Stanford University, Stanford, California
Division of Polar Programs and the — Washington, D.C.
Atmospheric Sciences Section of the
National Science Foundation

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
Dr. T. Bell	Radioscience Lab. Stanford Univ.	(415) 497-3587
Dr. D. L. Carpenter	Radioscience Lab. Stanford Univ.	(415) 497-3585

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. Helliwell, R. A. and J. P. Katsufrakis, "VLF Wave/Injection Into The Magnetosphere From Siple Station, Antarctica".

b. Leavitt, Mark Keith, "A Frequency-Tracking Direction Finder For Whistlers and Other Very Low Frequency Signals".

c. Raghuram, Rajagopalan, "Suppression Effects Associated With VLF Transmitter Signals Injected Into the Magnetosphere".

d. Stiles, Gardiner Stuart, "Digital Spectra of Artificially Stimulated VLF Emissions".

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

Studies of wave-particle and wave-wave interactions using a VLF transmitting facility located at Siple Station, Antarctica. The VLF transmitting facility consists of a 150 KW transmitter and 21.2 km elevated center-fed dipole antenna.

The Siple transmitter was set up in order to achieve a controlled means of probing the magnetospheric plasma. A passive VLF receiving facility was established at the conjugate point to Siple at Roberval, Quebec, Canada.

Since the transmitter modulation, frequency, and power are key parameters in the interaction process, a real time communication link between Roberval and Quebec was required to optimize the experiment. The operator at Roberval recommends the transmitting parameters based on his observation of the behavior of the natural phenomena at Roberval.

Since using the ATS-3 communications and data link between Roberval and Siple Station the data acquired have increased by 500% and specific experiments have been conducted on a time scale of one month versus several months previously (without real time communications).

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

The experiment has been highly successful and we can now conduct various specific experiments and achieve our scientific objective, in a much shorter time (one month versus six months).

In addition when no interactions are taking place we can terminate operations and conserve diesel fuel, an expensive commodity when d elivered 12,000 miles from the United States to the Antarctic.

SURVEY FORM FOR ATS USERS

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☐ No

Have explored possibility of commerical satellites. None in view of Siple Station.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No

We believe, in the long run that the results of our experiment will have an effect on communications (HF, etc.) such as blackouts, etc.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

NASA has been most helpful in our experiments.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

If the ATS series is continued we would like communications capability on the Siple Station Meridian and we would like to have video, teletype, and voice capability. This would greatly enhance our data transmission. In addition the VLF spectrum (.3030 kHz) could be transmitted from Roberval to Siple thereby providing the response signatures to the stimulating signals from Siple that can be observed by the Siple Station personnel.

SURVEY FORM FOR ATS USERS

1. NAME: James O. DeBree & Carl J. Hoffman

2. ADDRESS: Cooperative Extension Service
Montana State University
Bozeman, Montana 59715

3. TITLE OF EXPERIMENT: Operation TEAM (Televised Educatien Applied to Montana)

4. DATE STARTED: September, 1977? DATE ENDED: Unknown

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☒ ATS-6 ☐ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☒ e. Educational Applications
- ☐ f. Law Enforcement
- ☐ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT:
To determine the feasibility of using satellites to conduct educational programs in rural communities and sparsely populated areas.

8. PARTICIPATING ORGANIZATION: Cooperative Extension Service

ADDRESS: Montana State University
Bozeman, Montana 59715

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
None		

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. NONE

b.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

Video tapes will be developed on campus of Montana State University and transmitted by satellite to ground terminals throughout the State. Subject matter will include topics related to agriculture production and marketing, natural resources, home economics, families, youth and community development.

Initially we planned for uplink capabilities on campus and in the field so two-way audio and video would be possible. This capability would allow specialists on campus to review problems in the state and provide immediate responses. Example: our plant pathologists could examine disease-infected plants by satellite video and offer immediate recommendations for corrective action. Present procedures require forwarding a sample to Bozeman for diagnosis and recommendations. This can take up to three weeks and in some cases the entire crop can be lost or treatment can be too late to be effective.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

It has given us some insight into what it takes to initiate a new system. To date our experiment is still in limbo. We have not been able to acquire financing to purchase transmitters or ground terminals. We find it very difficult to generate trust among those agencies of the Federal government that could furnish funding for hardware required to support the experiment.

SURVEY FORM FOR ATS USERS

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No It would be too expensive to buy time on a commercial satellite.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No Two-way video and audio would help to facilitate understanding in educational programs. Use of satellites would accelerate the decision-making process. Current information provided by satellite would provide more accurate decisions in disease control, marketing, purchasing, etc.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

Assist in securing financing for supportive equipment. NASA has been most helpful in facilitating dialogue with other agencies. By forming a coalition with experimenters, I believe Congress would be more receptive to financing specific projects.

If NASA would extend experiments to cover 3-5 years we could attract local funds to finance hardware. They are extremely reluctant to finance equipment on an annual basis.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

Two-way vido and audio--transmitters capable of uplinking to the satellite and ground terminals.

SURVEY FORM FOR ATS USERS

1. NAME: Dr. David G. Whitlock

2-009

2. ADDRESS: Box 111 UCMS
Dept. of Anatomy
Denver, Colorado, 80262

6

e-N

3. TITLE OF EXPERIMENT: Advanced Science Education Delivered by Satellite to Undergraduate Students at U. of Wyo. from UCMS.

4. DATE STARTED: Projected Jan. 1, 1978 DATE ENDED: Dec. 31, 1983

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☒ ATS-6 ☐ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☒ e. Educational Applications
- ☐ f. Law Enforcement
- ☐ g. Communications
- ☒ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT:

To aid a remote and developing school delivery high quality basic science course originating from the U. of Colorado Medical School.

8. PARTICIPATING ORGANIZATION: ADDRESS:

UCMS	Denver
U. of Wyo	Laramie, Wyo
NASA	Goddard, Md.
NFME	Hartford, Conn

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
David G. Whitlock	Box 11, UCMS	(303) 394-8211
William Pancoe	U. of Wyo	

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a.

b. None on this project for it has not started. Related publications on computer application, Exp. in Medical Education in Secus, Book, Anatomical Record, and J. for Medical Education

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

Using course evolved at UCMS over the past eight years which has been evaluated extensively and compared with a control, the A.V., C.A.I., C.T. Scanner images and anatomy, lecture and demonstration would be delivered from the originator school to students at U. of Wyo. The program would be evaluated.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

No anticipated negative aspects. Funding of project continues to be a problem.

SURVEY FORM FOR ATS USERS

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☐ No Maybe - depends on funding

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☐ Yes ☒ No No, but have far reaching importance for national even international education.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

Have been very helpful.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

Microwave links from UCMS to NCL and DOT install ROT in Laramie at U. of Wyo.

SURVEY FORM FOR ATS USERS

2-512

1. NAME: Fleet Analysis Center (Code 8542, B. Erickson)

2. ADDRESS: Naval Weapons Station, Seal Beach
Corona, California 91720

3. TITLE OF EXPERIMENT: Fleet Analysis Center Satellite Communications Experiment

4. DATE STARTED: January 13, 1977 DATE ENDED: Extension requested to December 31, 1977

5. SATELLITE DESIGNATION: ☐ ATS-1 ☒ ATS-3 ☐ ATS-5 ☐ ATS-6 ☐ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☒ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT:

To determine the viability of using a satellite communication link for transmission of data between Fleet Analysis Center at Corona, California and its field station located in Puerto Rico.

8. PARTICIPATING ORGANIZATION: ADDRESS:

PARTICIPATING ORGANIZATION:	ADDRESS:
Fleet Analysis Center (Code 8542)	Corona, California 91720

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
None		

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. None

b.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

The experiment involves the use of two ground stations, one located at Corona, California and the other at Roosevelt Roads, Puerto Rico. The experiment is to include the tranmission of both digital data and verbal communication between the two sites to determine if inexpensive terminals can be utilized for transmission of data which cannot be accomodated by commerical telephone lines between the two points.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

The two stations have been operating and providing excellent communications between Puerto Rico and California. Data Tranmission using ATS-3 tests have been conducted to determine the data rates that can be accomodated with the inexpensive ground terminals being used. These tests verify that a 2400 band rate can be transmitted and received with an acceptable error rate for the intended applications. Additional experiment time is required to complete digital data transmission tests.

SURVEY FORM FOR ATS USERS

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No

Funding is not presently available to support the continuation of the experiment with commercial satellites.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No

The experiment demonstrates that a commerical organization having remote sites can transmit important data to a home base even through adequate commerical telephone lines are not available.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

The assistance and fast response by NASA on this experiment has been outstanding and has been greatly appreciated.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

No additions recommended at this time.

SURVEY FORM FOR ATS USERS

1. NAME: Mathews, Carl S.

2. ADDRESS: Room 4620, Main Commerce Bldg.
14th and F streets N.W.
Washington, D.C. 20230

3. TITLE OF EXPERIMENT: Maritime Satellite Program

4. DATE STARTED: 1971 DATE ENDED: 1975

5. SATELLITE DESIGNATION: ☐ ATS-1 ☒ ATS-3 ☒ ATS-5 ☒ ATS-6 ☐ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☒ g. Communications
- ☒ h. Medical/Health Applications
- ☐ i. Meteorology
- ☒ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT:

To improve profitability of U.S. Flag Merchant Fleet.
- Bring land-line-quality telephone and data services to ships at sea
- Improve shipping company management

8. PARTICIPATING ORGANIZATION: ADDRESS:

PARTICIPATING ORGANIZATION:	ADDRESS:
NASA	Goddard Space Flight Center
COMSAT GEN.	L'Enfant Plaza
NOAA/NWS/NFSS	

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
S.D. Wheatley	U.S. NMRC-Kings Point, NY	516-482-8200

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a.

b. See attached.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

See attached.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

See attached.

SURVEY FORM FOR ATS USERS

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☒ Yes ☐ No

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

N. A.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

N. A.

Advanced Navigation/[illegible]unications
(Satellite-related Fi[illegible] Services)

PROGRAM SUMMARY

1. PROGRAM BACKGROUND

An assessment was made in 1969 to identify for the maritime shipping system the best technologies of the U.S. to solve specifically defined problems. From this analysis, satellites and computers were identified. On the requirements side, communications have consistently been a deficient area. Another problem area lies in the application of computer techniques to ship management, following the development and use of such systems ashore.

The outcome of these considerations was to develop programs which would both utilize these technologies in which the U.S. had a significant international lead and which offered a "leap forward" rather than an evolutionary development. From these concepts, the satellite and SOIS programs were formulated. They developed programmatically quite differently because of the hardware deficiencies in equipment available to the satellite program.

Changes in ship subsystems and increased rotation of crews make oversight assessment by management of modern expensive ship operations necessary and economic.

The basic communication techniques and experimental management assessments have been made in the maritime satellite program. This program element, Fleet Services, builds on previous accomplishments and integrates portions of the other Advanced Ship Operations programs.

The Maritime Satellite program, extending through FY 1977. Its phased program included:

- o Phase A (pre FY 71) - Single ship VHF tests of limited scope as demonstrations
- o Phase I (FY 71) - Study of system concepts and benefits of an integrated approach to the use of satellites for maritime communications and navigation. This phase included a feasibility demonstration of ship communications with a new radio frequency band that was subsequently adopted internationally for global satellite use.
- o Phase II (FY 71-73) - A major concept validation and user evaluation project involving NASA satellites and nine U.S. ships in the Atlantic and Pacific Oceans. Early operation of the Maritime Coordination Center.

- o Phase III (FY 74-75) - A technol[illegible]monstration using operational radio frequencies and the first s[illegible]antial attempt to validate benefits by ship operators. Two [illegible]ps in the North Atlantic. Expanded operation of Maritime Coordination Center.

- o Phase IV (FY 75-77) - Development and evaluation of management techniques using satellite capability. [illegible] commercial system, MARISAT, will be used. Up to 12 companies may be involved, on a one ship per company basis.

This Phase shifts the emphasis from highly technical to highly management-oriented technique areas. Some technical development continues to make available such capabilities as digital facsimile, data circuits, shipboard-shore computer-to-computer data handling, and limited ship data acquisition projects.

By the end of FY 1977, technical developments will have been substantially completed in the satellite area. Emphasis initiated by the fleet management tests will be shifted to techniques for fully exploiting the satellite capability by exchanges of data between the ship and its shore control. This new program emphasis, Fleet Services, incorporates and extends the space technology available.

a. Objectives -- The objectives of this program are to: (1) extend to ships the quality, real-time communication services now provided between locations ashore, (2) enable continuous, accurate ship location information to be available for use both by ship and shore stations, (3) bring into use by U.S. companies new ship management techniques that exploit aerospace technology.

The program supports Presidential Objective 22-1, Increase Operating Efficiency, through the use of management techniques which expand use of the technologies described above. A high degree of integration is anticipated with the Ship Control and SOIS Programs which will also utilize the modern communications tool which the satellite program has provided.

b. Benefits — Applications of maritime satellite communications technology developed in this program offer the capability for reduced operating costs and the implementation of new management techniques not previously possible. Examples are:

- o Real time comparison of satellite acquired ship operating data with ship operating standards.

- o Provision for immediate correction of operating problems to assure improved ship performance.

- o Exchange of cost element information between shore and ships for improved management.

- Development of position determination and navigation to optimize ship routing and reduce fuel costs.

- Reduction of error and processing costs in information interchange, and less "paperwork" through computer analysis and report generation. Probable benefits from Fleet Management systems using satellite ship-shore communications have been previously identified in the range from $50,000 to $200,000 per ship per year. During the FY 75-78 period, application of the techniques will be used to validate estimated benefits.

This MarAd project has stimulated sufficient investment interest to generate a Commercial Maritime Satellite service which will be available in 1976.

Use by U.S. shipping companies is expected during and after the evaluation program. Close coordination with other ship operations projects provides new approaches to ship management for U.S. ships.

Progress to date has put the U.S. about two years ahead of foreign nations in the application of aerospace technology to maritime requirements.

Experiments continue in the application of the maritime satellite system for management and operational innovations. By the early 1980's a global fleet management system will be possible through satellite communications resources utilized by Computer-aid management and efficient ship systems. A major thrust of this program is to assist U.S. shipping companies to determine and evaluate the benefits associated with use of such a system.

2. PROGRAM PLAN

a. Accomplishments to Date

1) L-band experiments - The first phase, completed in June 1971, came up with effective satellite communications concepts, preliminary cost benefits, and a program to reach objectives. During Phase I, at-sea tests were conducted of the L-band frequencies which were subsequently assigned internationally for this purpose. The tests were successful and established that the frequency band would prove effective.

2) C-band experiments - In phase II, equipment was put aboard the nine U.S. flag test ships and the Maritime Coordination Center was built at the National Maritime Research Center at Kings Point. A five month operational test using two NASA technology satellites, was conducted. During this at-sea test period more than 600 ship-days of testing provided for the transmission of 5000 messages. The shipping companies conducted 125 experiments on advanced communication and navigation techniques. The test employed C-band frequencies because that was the only band available on these satellites.

3) ATS-6 experiments - For Phase III, the NASA satellite ATS-6 was available to MarAd for about 300 hours during the August 1974 - May 1975 time period. Because of its particular antenna characteristics, coverage is limited to ships in the North Atlantic Ocean. Two ships participated in the tests. Significant technical data on both communications and navigation obtained will enable a more definitive understanding of the future system capabilities. Concurrently, a series of fleet management tests have provided a preliminary benefit data.

4) Early commercial satellite experiments - Sufficient technical development of ship equipment and system requirements has been completed to allow most remaining developments occur in the commercial area.

The exposure of the MarAd program is considered to have been an important element in the decision of the U.S. companies to initiate very early maritime satellite service in advance of international planning now in progress for global international systems in the early 1980's.

SURVEY FORM FOR ATS USERS

2-012

1. NAME: John M. Morrison

2. ADDRESS: Department of Oceanography
Texas A&M University
College Station, Texas 77843

3. TITLE OF EXPERIMENT: International Southern Oceans Studies: FDRAKE

4. DATE STARTED: January 1975 DATE ENDED: December 1980

5. SATELLITE DESIGNATION: [X] ATS-1 [X] ATS-3 [ ] ATS-5 [ ] ATS-6 [ ] CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. Maritime Traffic Control
- [ ] c. Broadcasting
- [X] d. Data Transmission
- [ ] e. Educational Applications
- [ ] f. Law Enforcement
- [X] g. Communications
- [ ] h. Medical/Health Applications
- [ ] i. Meteorology
- [ ] j. Navigation
- [ ] l. Other _____

7. OBJECTIVE OF EXPERIMENT: coordination and scientific control of multi-ship investigations of the Antarctic Circumpolar Current. Included real-time processing and data exchange between ships at sea and shore stations.

8. PARTICIPATING ORGANIZATION: ADDRESS:

Texas A&M Univ. (Dept of Ocn)	College Station, Texas 77843
Oregon State Univ. (School of Ocn)	Corvallis, Oregon 97331
U. of Washington (Dept. of Ocn)	Seattle, Washington 98105
Woods Hole Oceanographic Institute	Woods Hole Mass. 02543

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. The use of the ATS system has been mentioned in various journal articles, but no specific article about use of the system has been written.

b.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

FDRAKE (First Dynamic Responce and Kinematic Experiment)- This experiment by the International Southern Oceans Studies combines both a monitoring experiment to study the statistical properties and space-time scales of variability of the Antarctic Circumpolar Current (ACC) within the Drake Passage and local experiments to test theories of dynamical balance, mixing and exchange with other oceans. The specific goals of FDRAKE (which began in the Austral summer of 1974-1975) are: (1) to describe the energy-containing space and time scales in the Drake Passage in order to design a long-term experiment to monitor the transport and internal structure of the ACC to be carried our during FGGE, and (2) to describe selected property distributions within the Drake Passage and the Western Scotia Sea for the continuing study of mixing processes.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

Many ideas have been obtained or sharpened as a result of the FDRAKE experiment.

SURVEY FORM FOR ATS USERS

3:012

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☒ Yes ☐ No

Yes, we would possibly continue the use of some type of satellite communication/ data transferal system if it were not too cost prohibitive. Communication between the ships at sea and shore-based scientist and technical support groups have proved to be an integral part of our experiment. Real time exchange of data and ideas results in a means of modification of the experiment while the ships are at sea.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☐ Yes ☒ No

The only commercial application is that of reliable, good, and inexpensive communication with ships at sea. Might possibly have application in the realm of ship-to-shore communication because of the reliability and low cost of VHF radio equipment.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

NASA has given us all the help that we have requested.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

We would prefer that the existing VHF channels on the spacecraft be kept because of the low-cost of operating such a system. If this is not the case we will modify our systems to whatever frequencies there are aboard the satellite.

HCJB

JUL 27 RECD

E-N

Casilla 691, Quito, Ecuador, South America

July 19, 1977

Mr. Nicholas A. Engler
University of Dayton Research Institute
300 College Park Avenue
Dayton, Ohio 45469

Dear Mr. Engler:

I have just received a letter, dated July 12, from L. C. Gentile. He asked that we send our reply to you.

The World Radio Missionary Fellowship (also known as The Voice of the Andes or its call letters, HCJB) did present a request for the ATS-6 satellite in connection with Project Lookup of Clearwater, Florida. We were also presenting this project to the Ecuadorian government.

As of this time, no arrangement has been made in Ecuador for satellite reception. We are not continuing to pursue the matter here, although we, as an international broadcasting station, would be most happy to cooperate in any program of this kind that would have the approval of the local authorities.

Very cordially yours,

Abe C. Van Der Puy
President, WRMF

bms

THE WORLD RADIO MISSIONARY FELLOWSHIP, INCORPORATED, Box 3000, Opa-Locka, Florida 33055, Phone 305/624-4252
HERALDING CHRIST JESUS' BLESSINGS THROUGH RADIO AND TV · BIBLE COURSES · MEDICINE · LITERATURE

SURVEY FORM FOR ATS USERS

2-014

1. NAME: Robert G. Bland

2. ADDRESS: DOT/TSC, Code 531
Kendall Square
Cambridge, Ma. 02142

3. TITLE OF EXPERIMENT: L-Band Air Traffic Control Experimentation and Evaluation

4. DATE STARTED: August 1974 DATE ENDED: April 1975

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☒ ATS-6 ☐ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☒ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☐ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT:
To collect satellite-aircraft signal propagation data, evaluate L-Band avionics hardware designs and perform preliminary satellite voice and data communications demonstration tests in support of an aeronautical satellite system for the oceanic airspace (i.e., AEROSAT) and advanced system concepts for air traffic control over the contiguous United States (CONUS).

8. PARTICIPATING ORGANIZATION: ADDRESS:

PARTICIPATING ORGANIZATION:	ADDRESS:
DOT/FAA-SRDS(ARD-230)	2100 2nd St. S.W., Washington, D.C.
DOT/TSC, Off. of Air & Marine Systems	Cambridge, MA.
DOT/FAA-NAFEC	Atlantic City, N.J.
(SEE ATTACHED)	

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
Mr. Frank Carr	FAA-ARD-230, Washington, DC	202-426-8496
Mr. Frank Jefferson	FAA-NAFEC, ANA-330, Atl. City, N.J.	346-3907
Mr. RW Sutton	Boeing Airplane Co., Seattle, Wash.	206-435-1213

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. "Air Traffic Control Experimentation and Evaluation with the NASA ATS-6 Satellite", Final Report, 7 volumes, FAA-RD-75-173-I through VII.

b.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

(SEE ATTACHED)

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

(SEE ATTACHED)

SURVEY FORM FOR ATS USERS

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No

There is no commercial satellite with the L-Band repeater suitable for these experiments. Please note: these experiments are complete and no further use of ATS-6 is planned at this time.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No

Commercial satellites could provide the ATCsservices evaluated and deom demonstrated in this program.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

Provide another satellite with an L-Band repeater of high power and wide bandwidth.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

A high power pulsed transmitter (40 to 100 watts) on the satellite would be helpfull. In the ground facility a computer terminal would be helpful.

SURVEY FORM FOR ATS USERS

1. NAME: Krunoslav E. Draganovic

2. ADDRESS: Lamont-Doherty Geological Observatory
Palisades, N. Y. 10964
(914)-359-2900 (X-329)

3. TITLE OF EXPERIMENT: ATS-LAMONT

4. DATE STARTED: October 15, 1976 DATE ENDED: March 15, 1977

5. SATELLITE DESIGNATION: ☐ ATS-1 ☒ ATS-3 ☐ ATS-5 ☐ ATS-6 ☐ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☒ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT: to Maintain a two-way communication and data link (mainly telecopy) while being out at sea collecting oceanographic data.

8. PARTICIPATING ORGANIZATION: Columbia University

ADDRESS: Lamont-Doherty Geological Observatory
Palisades, N. Y. 10964

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
Paul Eden		

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a.

b.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

Oceanographic survey in Antarctic waters (between Capetown-Antarctic Continent-Buenos Aires) aboard Argentine Research vessel "ARA ISLAS ORCADAS. The intelligence exchanged with base station (Lamont, in Palisades, N. Y.) was mainly by voice communication and with graphs over telecopy (XEROX) machines.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

The system served its purposes to a great extent, but reliability was not high in marginal zones of coverage, namely North-South oscillations of satellite, multi-path conditions and scintilations. All these problems were only, or mainly, in zones where the antennas had to be pointed to very low angles.

SURVEY FORM FOR ATS USERS

E-015

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No

Not enough traffic. The present amount and type of traffic can be handeled by S. W. Radio.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☐ Yes ☐ No

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

There is a growing interest in antarctic regions, e.g., fishery, science, etc. It would be interesting to have a satellite "ITS-3 like" that would cover regions further south and east.

SURVEY FORM FOR ATS USERS

1. NAME: Dr. Jon W. Mark

2. ADDRESS: Department of Electrical Engineering
University of Waterloo
Waterloo, Ontario, Canada
N2L 3G1

3. TITLE OF EXPERIMENT: Signal Processing Techniques for Data Communication by Satellite

4. DATE STARTED: January 26, 1977 DATE ENDED: March 11, 1977

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☐ ATS-6 ☒ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☒ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT:

To examine certain signal processing techniques on compressed video data transmitted on a satellite channel and to model the combine satellite and terrestrial channel for data communication.

8. PARTICIPATING ORGANIZATION: Department of Electrical Engineering, University of Waterloo

ADDRESS: Waterloo, Ontario, Canada N2L 3G1

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
Dr. Ian F. Blake (co-investigator)	Department of Electrical Eng. University of Waterloo Waterloo, Ontario, Canada N2L 3G1	(519) 885-1211

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

** a. J. W. Mark et al, "Signal Processing Techniques for Data Communication by Satellite", CTS Experiment U-7, University of Waterloo, Waterloo, Ontario, Canada, April 1977.

b.

c.

d.

e.

*Please send copies of the above items as available
**Will send a copy at a later date

11. DESCRIPTION OF EXPERIMENT

A 1 meter antenna located at the University of Waterloo was used for two-way voice transmission with a 9 meter antenna located in Ottawa and an 3 meter antenna located at Moose Factory, Ontario, as remote loop-back facilities. The transmitted data were interfaced to the 1 meter antenna at voice band, so that the video (compressed and uncompressed) data had to be transmitted at a slow-scanned rate through a Codex 9600 data modem. Data were transmitted with and without convolutional coding/threshold decoding. Computer programmes resident in a PDP-11/45 computer were used to perform error detection and data compression/decompression functions.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

The experimental results indicate that in the absence of channel coding, sporadic channel errors do occur, which can introduce a lasting effect on the compressed video data. However, with the memory of the compression algorithms refreshed periodically, the effects of sporadic channel errors can be localized. With rate 1/2 convolutional channel coding, no errors were observed at data rates below 9600 bps.

Attempts on channel modeling using the measured data are inconclusive, primarily because our data were interfaced (Interface provided by CRC, Canada) to the antenna at voice band. As a result, what we can model is a channel with an effective bandwidth of 2400 Hz, which is not what we had hoped to obtain when the experiment was originally planned.

SURVEY FORM FOR ATS USERS

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No

Our experiment is str.. ly a technical experiment.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No

Data compression enhances channel utilization. The experiment demonstrates that, with minimum channel coding, compressed data can be sent over the satellite channel with virtually no degradation.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

SURVEY FORM FOR ATS USERS

1. NAME: Cecil D. Burge

2. ADDRESS: Box 267, Southern Station
Hattiesburg, MS 39401

3. TITLE OF EXPERIMENT: Application of Synchronous Satellite communications to Emergency Medical Services

4. DATE STARTED: 9/1975 DATE ENDED: in progress

5. SATELLITE DESIGNATION: ☐ ATS-1 ☒ ATS-3 ☐ ATS-5 ☐ ATS-6 ☐ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☐ g. Communications
- ☒ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT: to demonstrate the feasibility of paramedic/ambulance to emergency room physician communications for rural areas using satellite land mobile communications technology.

8. PARTICIPATING ORGANIZATION: ADDRESS:

NASA/NSTL	Bay St. Louis, MS
Forrest General Hospital	Hattiesburg, MS, 39401
Semaad EMS Service	Hattiesburg, MS, 39401

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
William G. Brundagg	Box 5165, Southern Sta. 39401	601-266-7305

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. NASA: Final Report RTOP 141-95-03

b. ELECTRO '77 Professional Program, Section 36,
Cecil D. Burge, Some Potential Applications of a Public Service Satellite in Health Care Delivery

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

Transmitted voice/EKG dialog between ambulance/paramedic team and emergency room physician via ATS-3. Ambulance was located (at separate times) at:

Montgomery, Alabama
Goddard Space Flight Center.
Emergency room of Forrest County General Hospital in Hattiesburg, Mississippi was base station.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

Demonstrated technical feasibility and medical validity of using synchronous satellites in an emergency medical communications role.

SURVEY FORM FOR ATS USERS

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No

There are no commercially available transponders compatible with this application.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No

Yard mobile transceivers.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

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16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

UHF & VHF transponders for mobile experiments

NOT [illegible] SURVEY FORM FOR ATS USERS AUG 9 [illegible]

1. NAME: JOHN H. KRAEMER

2. ADDRESS: DOT/TSC, Code 531
Kendall Square
Cambridge, MA.

3. TITLE OF EXPERIMENT: Maritime Communication Experiments and Search and Rescue Evaluations with the NASA ATS-6 Satellite

4. DATE STARTED: August, 1974 DATE ENDED: April, 1975

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☒ ATS-6 ☐ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☒ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☒ l. Other Search and Rescue

S

7. OBJECTIVE OF EXPERIMENT: To collect satellite-ship signal propagation data, evaluate shipboard antenna designs and voice and data communications modems and to demonstrate the operational uses of satellites for air traffic control and search and rescue applications.

8. PARTICIPATING ORGANIZATION: ADDRESS:

See attached list.

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
Mr. John M. Carros/GDOE-3	USCG 2100 2nd Street, S.W. Washington, D.C. 20590	202-426-1027

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. "Maritime Communication Experiments and Search and Rescue Evaluations with the NASA ATS-6 Satellite" Final Report, Vol I Summary, Vol II Text and Appendix, to be published

b.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT A two-way simultaneous communications link was established between a U.S. Coast Guard cutter and the NASA Rosman earth station via the ATS-6 satellite. Telephone land lines were set-up between Rosman and various remote ground facilities such as the NASA operations center, DOT Headquarters, DOT/TSC, USCG Rescue Coordination Centers, FAA/NAFEC, etc. The shipboard communications terminal was a self-contained small laboratory housed in a transportable shelter. The terminal operated with an experimental antenna which had a nominal gain of 15 dBi and was capable of various modes of stabilization and control as follows: a) Autotrack mode - the antenna locked to the L-band satellite transmission using a single-channel monopulse system;
b) Slaved mode - the antenna was open-loop controlled by the ship's gyrocompass system. Pointing information was programmed into the antenna controller.
c) Manual mode - antenna pointing was controlled via handwheel inputs to the antenna controller and was oriented in terms of "deck coordinates".
Communications and one-way ranging was accomplished using a variety of modems. The communications modems provided for both voice and data transmission and the channel probing equipment was capable of both boradband and CW operation.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)
o Acquired technical data essential to the design of satellite communications systems for marine applications
o Tested and rated components of potential new user electronics operating at L-band suitable for maritime services
o The experiments validated the applicability of laboratory simulation of propagation phenomena. Scientists can now be assured of knowledge gained pertinent to propagation using the laboratory simulation without resorting to costly field tests.
o The advantages of a coordinated USCG and FAA effort using satellites to interconnect widely dispersed aircraft and ships in a search and rescue operation were clearly demonstrated. The usefulness of satellites in conjunction with emergency notification procedures was borne out in demonstrating significant reduction in the distress alerting interval. Preliminary results were also obtained regarding direction finding operations with satellites.

SURVEY FORM FOR ATS USERS

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☐ No These experiments have been completed.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No The data gathered during this experiment provides data applicable to ship-satellite-shore communication system design.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

See Below

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

Provide either an earth coverage or variable shape beam at L-band to cover one of the major air traffic or shipping routes in the Atlantic Ocean.

SURVEY FORM FOR ATS USERS

1. NAME: John A. Kleppe

AUG 9 RE...
1-g-6

2. ADDRESS: Scientific Engineering Systems, Inc.
55 North Edison Way, P.O. Box 1171
Reno, Nevada 89504

3. TITLE OF EXPERIMENT: Experimental transmission of weather radar data using VHF satellite links between Antarctica & Reno, NV, USA.

4. DATE STARTED: Mid Feb. 1977 DATE ENDED: Ongoing

5. SATELLITE DESIGNATION: [x] ATS-1 [x] ATS-3 [ ] ATS-5 [ ] ATS-6 [ ] CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. Maritime Traffic Control
- [ ] c. Broadcasting
- [x] d. Data Transmission
- [ ] e. Educational Applications
- [ ] f. Law Enforcement
- [x] g. Communications
- [ ] h. Medical/Health Applications
- [ ] i. Meteorology
- [ ] j. Navigation
- [ ] l. Other _____

7. OBJECTIVE OF EXPERIMENT:

To design, fabricate, install and test a VHF satellite communications system for transmission of weather radar data and voice communications between Antarctica and Reno, Nevada, USA.

8. PARTICIPATING ORGANIZATION: ADDRESS:

Energy Research & Development Center	College of Engineering, University of Nevada
Desert Research Institute	Reno, Nevada 89507
National Science Foundation	Office of Solar Programs
	Washington, D.C.

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
Joseph A. Warburton	Desert Research Institute	
	University of Nevada, Reno, NV 89507	702-972-1676
~~Paul Lage~~	"	"
John Storms	P.O. Box 1171, Reno, NV 89504	702-322-7109

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. Kleppe, J.A. and J.A. Warburton (1977). Experimental transmission of weather radar data using VHF satellite links between Antarctica and Reno, Nev., U.S.A.
b. Proc. NAECON, Dayton, Ohio, May.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

A weather radar system was installed at Palmer Station, Antarctica and is being used to study mesoscale atmospheric-ocean interactions on the Antarctic Peninsula. A VHF satellite communications system was designed, fabricated and tested for transmission of data and voice communication between Antarctica and Reno, using VHF transponders aboard NASA ATS-1 and ATS-3 satellites. Tests were made using ground stations at McMurdo (via ATS-1) and Palmer Station (via ATS-3).

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

Results clearly showed high quality transmission of voice. At McMurdo there were approximately 6 hours a day of suitable coverage time. At Palmer Station excellent voice and facsimile communications were established at all hours of the day. There has been very good data transmission; however, due to local receiver noise problems in Reno, data transmission has been limited. This problem is now being worked out.

SURVEY FORM FOR ATS USERS

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No

Probably because of lack of coverage and/or expenses involved.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No

Establishment of voice and data communication with remote areas is invaluable in terms of instant data transference to control centers where it can be analysed without delay and instructions given to isolated workers if necessary. Voice communication is also an important psychological factor in the ability of persons to work for long periods in isolated environments.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

Could consider coverage in UHF similar to ATS-1, ATS-3 VHF satellits transponders.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

Excellent assistance is already available. NASA may want to consider more compact, updated ground stations that would be available for loan to temporary experimenters.

SURVEY FORM FOR ATS USERS

1. NAME: W.R. Dale

2. ADDRESS: NOW Department of Scientific & Industrial Research,
H.O., Private Berg,
Wellington, N.Z.

3. TITLE OF EXPERIMENT: U. of Hawaii PEACESAT Project

4. DATE STARTED: July 1972 DATE ENDED: Nov. 1974

5. SATELLITE DESIGNATION: [X] ATS-1 [ ] ATS-3 [ ] ATS-5 [ ] ATS-6 [ ] CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. Maritime Traffic Control
- [X] c. Broadcasting
- [ ] d. Data Transmission
- [ ] e. Educational Applications
- [ ] f. Law Enforcement
- [X] g. Communications (Voice)
- [ ] h. Medical/Health Applications
- [ ] i. Meteorology
- [ ] j. Navigation
- [X] l. Other Agricultural Information

7. OBJECTIVE OF EXPERIMENT:

Information exchange in agriculture.

8. PARTICIPATING ORGANIZATION: ADDRESS:

Ministry Agriculture & Fisheries — P.O. Box 2298, Wllington, NZ

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
Mr. PD Thompson	Min. Ag. & Fish., Box 2298, Wellington, NZ	

NOTE: WR Dale no longer is employed by MAF, who had acted as primary motivator and coordinator.

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. Review of PEACESAT Agricultural Seminars, July-Nov. 1972 (Report to Director Advisory Services Division) in 1973 PEACESAT Project Report to NASA as Evaluation Report 10,
b. November 1972, Vol. 3.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

Monthly links for problem solving and extension of technical information on a wide range of agricultrual topics within the Peacesat link.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

1. New personal contacts which provided new information and literature exchange.
2. Stimulus to recipients
3. Provision of reference people within region (SW Pacific especially)
4. Training in skills of voice communication.

SURVEY FORM FOR ATS USERS

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☐ No

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☐ Yes ☐ No

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

SURVEY FORM FOR ATS USERS

2-23

1. NAME: Dr Pierre Girard

2. ADDRESS: Institute of Research of Hydro Quebec
1800 Montée Ste-Julie
Varennes, Québec
J0L 2C0

3. TITLE OF EXPERIMENT: Communication between Hydro Quebec Research Institute (IREQ) and Sept-Iles

4. DATE STARTED: October 19, 1977 DATE ENDED: December 18, 1977

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☐ ATS-6 ☒ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☒ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT:

1. Characteristics of communication channels.
2. Clocks synchronization with a precision of ±40μsec.
3. Phase angle measurement between IREQ and Sept-Iles on a 735kVolts lines.

8. PARTICIPATING ORGANIZATION: ADDRESS:

PARTICIPATING ORGANIZATION:	ADDRESS:
Institute of Research of Hydro Quebec	1800 Montée Ste-Julie, Varennes, Québec
Hydro Quebec	75 Dorchester, Montreal

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
Dr Gilles Missout	1800 Montée Ste-Julie, Varennes	652-8574

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. P. Girard, G. Missout, "Measurement of Bus Voltage Angle Between Montreal and Sept-Iles", IEEE PES Summer Meeting, Mexico, July 17-22, 1977.

b. P. Girard, G. Missout, "Study of a Method of Clock Synchronization by Satellite for Future Hydro Quebec Needs", International Electrical, Electronics Conference and Exposition, Toronto, September 29-30 and October 1, 1975, Cat. #75-24901, pp. 124-
c. 125.

d. P. Girard, G. Missout, "Participation de l'Hydro-Québec à l'Expérience du Satellite Technologique de Télécommunications (S.T.T.)", 45ième Congrès de l'A.C.F.A.S., Trois-Rivières, 19-21 mai, 1977.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

In a few years from now, Hydro-Québec will be taking control of all the electrical networks in the province that are not yet connected to the main power system. This includes northern Québec stations presently under provincial and federal government jurisdiction such as Fort Chimo, Port Harrisson and Sugluk. Others, such as those along the north shore of the St. Lawrence River, are already under Hydro-Québec's trusteeship.

In view of the great distances separating these unconnected networks from the main power system, communications represent a rather tricky problem. So far, public telephone links, when available, and HF radio links have been used for this purpose but, in view of future development plans in Québec, these communications methods do not seem able to assure the necessary degree of reliability and availability. Satellite communications could fill this need.

It was in this context that Hydro-Québec proposed to take part in the experiment with the Communications Technology Satellite (CTS). The experiment comprised three stages:

1) Measurement of the quality of the link;
2) Clock synchronization;
3) Phase-angle measurement.

The experiment took place between October 19 and the middle of December 1977. The CTS equipment comprised: (verso)

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

From the measurement of the quality, it is obvious that the satellite offers a high-quality telephone link which is readily transportable and easy to use in remote areas. The reliability of the link seems to be excellent, despite a few equipment failures that occurred during the experiment, and could easily be increased by minor modifications (wave guide, mounting platform, indicating lamps, etc.).

A differential method was used for clock synchronization. A signal is emitted by a clock that is in advance of real time; it passes through the satellite to the main station at Ottawa, comes back to the satellite and finally returns to the sending station (IREQ) and the point be synchronized (Sept-Iles); it maintains first-order independence of the satellite position. The theoretical value of the differential delay is 2,221 ±3μs. With the audio-program unit, the experimental value is 2,179 ±8μs., which shows a deviation of 42 ±10μs.

1. DESCRIPTION OF EXPERIMENT

1) Two antennas, one meter in length, with an audio program transmit and receive unit located at IREQ;
2) One antenna, one meter in length, with an audio-program receive unit located at Arnaud substation, Sept-Iles.

2. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

Considering all the possibilities of time deviation that two receive units represent, this result is most satisfactory. With a telephone link, the deviation is stable, within a few microseconds, during any one experiment but fluctuates considerably from one experiment to the other (2.1 to 2.3 ms).

Two synchronized clocks were used to measure the phase difference on phase A of the 735-kV line linking Arnaud substation and Boucherville substation. The results show that the phase difference remains relatively constant over a period of several hours but that it varied from 32° to 42° throughout the experiment. These measurements were corroborated by load-flow calculations performed by Hydro-Québec's System Control department.

SURVEY FORM FOR ATS USERS

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

[X] Yes [ ] No

With NOAA's geostationary operational environmental satellites.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

[X] Yes [ ] No

1. Method of clock synchronization

2. Phase angle measurement

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

- Importable earth terminal with APTU and APRU

SURVEY FORM FOR ATS USERS

AUG 16

1. NAME: R. M. Lester
Director, Communication Systems

2. ADDRESS: Telesat Canada
333 River Road
VANIER, Ontario K1L 8B9

Tel: (613)746-5920

3. TITLE OF EXPERIMENT: Transportable Telecommunications System
CTS EXPERIMENT I-1

4. DATE STARTED: May 3, 1976 DATE ENDED: August 28, 1976

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☐ ATS-6 ☒ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☒ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☑ l. Other _____

7. OBJECTIVE OF EXPERIMENT:

The experiment was designed to evaluate the degree of portability and to identify any field problems associated with a remote 1-meter antenna ground station. The remote equipment provided a single two-way telephone channel to northern locations (e.g. Frobisher Bay) in conjunction with a fixed Ottawa-based ground station and the CTS satellite.

8. PARTICIPATING ORGANIZATION:

PARTICIPATING ORGANIZATION:	ADDRESS:
Telesat Canada	333 River Road, VANIER, Ontario
Bell Canada	160 Elgin Street, OTTAWA, Ontario

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
H. P. Chamberlain	Satellite Distribution Systems Manager, ~~Bell Canada~~ 160 Elgin Street, 2nd Floor GOLD, OTTAWA, Ontario ~~K1G 3J4~~	(613)239-2586

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. Bell Canada/Telesat Canada, "Report of a Transportable Telecommunications System" Experiment I-1 Communications Technology Satellite Program (attached).

b.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

Experiment I-1 was a joint venture of Bell Canada and Telesat Canada which was carried out as a field evaluation exercise. As such, regular Plant operating practice was followed as much as possible and Plant operating personnel in both companies carried out the procedures in addition to their normal duties.

The experiment was designed to evaluate the degree of portability and to identify any field problems associated with a remote 1-meter antenna ground station. The remote equipment provided a single two-way telephone channel to northern locations (e.g. Frobisher Bay) in conjunction with a fixed Ottawa-based ground station and the CTS satellite.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

The concept of utilizing the transportable telecommunications terminals with the CTS satellite for single channel temporary applications was proven operationally feasible. The message telephone circuit transmission quality provided by the terminal was very good.

The 1-meter ground station supplied by Canadian Department of Communications (CRC) proved to be reasonably transportable in the Far North, recommendations have been made for improvements in the design of the terminal to enhance its transportability.

SURVEY FORM FOR ATS USERS

9-025

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No

- not applicable (experiment was successfully completed).

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No

The concept of utilizing the transportable telecommunications terminals with the CTS satellite for single channel temporary applications was proven operationally feasible.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

a) Continue with experimental satellite systems such as ATS, with the emphasis on technology development.

b) Reduce the costs of launching satellites. The Space Shuttle is a positive step in this direction.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

Stable beacons to permit propagation experiments at higher frequencies would be useful.

Development of advanced technology in satellites and earth stations would also benefit future applications.

SURVEY FORM FOR ATS USERS

2-027

1. NAME: DAVID GREEN

2. ADDRESS: 324 Middlefield Rd.
Mendo Park, California 94025
Educational TV Center

3. TITLE OF EXPERIMENT: Project Interchange CTS Exp. #16

4. DATE STARTED: Spring 1976 DATE ENDED: Continuing

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☐ ATS-6 ☒ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☒ e. Educational Applications
- ☐ f. Law Enforcement
- ☐ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT: Apply satelite telecommunications to link ground distribution systems of ITFS and CATV/ in individualization and special education.

8. PARTICIPATING ORGANIZATION: ADDRESS:

PARTICIPATING ORGANIZATION:	ADDRESS:
Archdiocese of San Francisco	San Francisco, CA
Torrance Unified School District	Torrance, CA
San Diego Country Supt. of Schools	San Diego, CA

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
Dr. Helen Dell	same	(415)326-7850
	D-249	

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. Green, David; Project Interchange, Report #1 (Paper), Nov. 1976

b. Green, David; Roject Interchange, Report #2 (Paper), June 1977.

c.

d.

e.

*Please send copies of the above items as available (Attached)

11. DESCRIPTION OF EXPERIMENT

Outline in Paper Appendex

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

Outline in Paper Appendex

SURVEY FORM FOR ATS USERS

B-028

ATS-6
SC-B

1. NAME: Raymond S. Berkowitz and Bernard D. Steinberg

2. ADDRESS: University of Pennsylvania
Moore School of Electrical Engineering
Valley Forge Research Center
Philadelphia, Pa. 19174

3. TITLE OF EXPERIMENT: L-Band Spatial Correlation Experiment

4. DATE STARTED: August 1976 DATE ENDED: January 1977

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☒ ATS-6 ☐ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☒ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☒ j. Navigation
- ☑ l. Other _____

7. OBJECTIVE OF EXPERIMENT:
To measure phase differences between L-band CW signals (1550 MHz) arriving at receivers on the ground separated by distances up to 1000 ft at the Valley Forge Research Center. This would give a measure of the phase spatial correlation and determine limitations on how large an antenna array can be made.

8. PARTICIPATING ORGANIZATION: University of Pennsylvania

ADDRESS: Moore School of Electrical Engineering
Valley Forge Research Center
Philadelphia, PA. 19174

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
Bernard D. Steinberg	U. of PA., VFRC, Phila., Pa. 19174	215 243-6352
Tong. L. Lim	Same (U. of Pa.)	215 243-4406
Earl N. Powers	VFRC, RD 3, Box 108, Malverne, Pa. 19355	
V. Chauncey Angell	VFRC, RD 3, Box 108, Malverne, Pa.	

3-028

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. R.S. Berkowitz, Spatial Correlation Experimental Effort, VFRC QPR No. 16, pp. 26-31, (Feb. 1976).

b. E.N. Powers, Spatial Correlation Experiments Consideration, VFRC QPR No. 17, pp. 52-57, (May 1976).

c. R.S. Berkowitz, Sparial Correlation Experiment, VFRC QPR No. 18, pp. 93-99, (Aug. 1976).

d. T.L. Lim, Spatial Correlation Experiment, VFRC QPR No. 19, pp. 39-45, (Nov. 1976).

e. T.L. Lim, Spatial Correlation Experiment, VFRC QPR No. 20, pp. 32-50, (Feb. 1977)

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

Two Receivers are used, each being made up of a 4-ft dish (RCP), a low noise amplifier, mixer, IF amplifier (42 MHz center Frequency) and a buffer which serves as a line driver for the cables carrying the IF signals. Common local oscillator power at 1508 MHz is piped to the receivers by low loss cables each extending up to 500 ft. The IF outputs are fed into a vector voltmeter which measures the phase difference between the two CW signals. Hard copies of the result are made with a paper chart recorder.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

Up to 1000 ft. separations, the measured phase differences at L-band are less than 1 degree at all times of the experiment.

SURVEY FORM FOR ATS USERS

2-028

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No

Present Experiment concluded.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☐ Yes ☒ No, Not Yet.

We have to go to larger receiver separations to determine when the phase fluctuations increase significantly and hence limit the size of the array.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

During the carrying out of our experiment the NASA control personnel involved were very helpful in providing satellite data as requested. The experiment might have been more significant if more frequent and larger periods of use were permitted.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

At least present capability should be maintained.

SURVEY FORM FOR ATS USERS

1. NAME: C D Tollios

Z-02?

2. ADDRESS: Bigelow Labs
Woods Hole Oceanographic Inst.
Woods Hole, Mass 02543

3. TITLE OF EXPERIMENT: KNORR

4. DATE STARTED: 15 Jan 1977 DATE ENDED: 31 June 1977

5. SATELLITE DESIGNATION: ☐ ATS-1 ☒ ATS-3 ☐ ATS-5 ☐ ATS-6 ☐ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☒ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☒ l. Other Transmitting and receiving scientific oceanographic information, Facsimile

7. OBJECTIVE OF EXPERIMENT: to facilitate scientific decision making at sea by providing the scientist with daily updates of pertinent variables not otherwise available aboard ship. Also we plan to install the computer-to-computer data communication capability presently being developed at the University of Miami.

8. PARTICIPATING ORGANIZATION: ADDRESS:

PARTICIPATING ORGANIZATION:	ADDRESS:
Woods Hole Oceanographic Inst.	Woods Hole, Mass 02543
University of Rhode Island	Marine Labs, Narragansett Bay Campus
Texas A & M	College Station, Texas
University of Miami	

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
Dr. Phillip Richardson	Woods Hole Oceanographic Inst.	(617) 548-1400x546
Dr. Terry Joyce	"	" x530
Dr. Peter Weibe	"	" x313

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a.

b.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

A daily schedule is maintained during which audio and facsimile data are transmitted with such information as positions of satellite-tracked buoys, schematic diagrams, and plotted data. Phone patches are made to personnel preparing to join the ship at the next port and to shore-based associates for advise on work underway.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

Positive aspects: 1) ability to transmit facsimile data which can contribute to cruise decision-making. 2) allows scientist to keep in touch with shore personnel for advise and future planning. 3) communications improvements result in higher morale.

Negative aspects: 1) noise and interferance the satellite picks up 2) reception is consistently poorer between 1200Z and 1700Z See question # 16 also.

SURVEY FORM FOR ATS USERS

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No At this time funding is not available for this purpose. Also we do not forsee that it will become available.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No Commercial applications are feasible as demonstrated by the Marisat operation. However, operation on such a network would be economically impossible for the scientific oceanographic community at this time.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

A directory or summary of other experiments would be useful in opening avenues for exchange of information among users with similar applications or objectives.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

1. Would like to see satellite coverage for eastern Africa and Indian Ocean.
2. Instituting an idea proposed at the University of Miami: usage of low power teletype at the 3db skirts of channels 2,3 & 4 would alleviate much of the traffic during the scheduled times, leaving more time available for scientific use.
3. Increasing the power of the satellites to allow simultaneous multi-channel operation.

SURVEY FORM FOR ATS USERS

1. NAME:
L.A. Maynard

2. ADDRESS: Communications Research Centre
P.O. Box 11490, Station 'H', Ottawa, Ontario, K2H 8S2

3. TITLE OF EXPERIMENT:
Effects of Low Angle Reflection of Electromagnetic Waves

4. DATE STARTED: 10 August 1977 DATE ENDED: 22 August 1977

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☒ ATS-6 ☐ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☐ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☒ l. Other Basic Research

7. OBJECTIVE OF EXPERIMENT:

1. To measure the effects of low elevation angle sea scatter on L-band and VHF signal frequencies.

2. To measure signal fading at C-band and MMW for very low elevation angle transmission paths.

8. PARTICIPATING ORGANIZATION: Communications Research Centre

ADDRESS: P.O. Box 11490, Station 'H', Ottawa, Ontario, K2H 8S2

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
J.H. Chinnick	Communications Research Centre	(613) 596-9449
K.S. McCormick	P.O. Box 11490	(613) 596-9698
	Station 'H'	
	Ottawa, Ontario, K2H 8S2	

Z-03

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. Under preparation.

b.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

This was a multi-frequency experiment which measured direct path fading at VHF, L-band, C-band, and MMW, and measured reflection coefficients at VHF and L-band for vertical, horizontal and circular polarizations. These measurements were made as the satellite appeared over the local horizon in Newfoundland during the western drift of the ATS-6 satellite.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

1. Very good data on sea reflection coefficients at 1.550 GHz.

2. Poor VHF data.

3. Other data not completely analyzed.

SURVEY FORM FOR ATS USERS

2-030

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No

Experiment completed.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☐ Yes ☒ No

This was more of a research type effort. Any commercial application would be in the area of permitting more definitive description of low angle propagation conditions.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

SURVEY FORM FOR ATS USERS

AUG 1 8 [illegible]

1. NAME: L.A. Maynard

2. ADDRESS: Communications Research Centre
P.O. Box 11490, Station 'H',
Ottawa, Ontario, K2H 8C2

3. TITLE OF EXPERIMENT:
Data Modem Performance Under Conditions of Sea and Land Scattered Multipath

4. DATE STARTED: 14 March 1977 DATE ENDED: 25 March 1977

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☒ ATS-6 ☐ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☑ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☒ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT:
To evaluate the error rate performance of data modems under conditions of severe multipath. Tests were made from an aircraft flying over bush, ice and ocean surfaces.

8. PARTICIPATING ORGANIZATION:

	ADDRESS:
Communications Research Centre	P.O. Box 11490, Station 'H', Ottawa, Ontario
Transportation Systems Center	Kendall Square, Cambridge, MA, 02142

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
J.H. Chinnick	CRC/P.O. Box 11490, Station 'H' Ottawa, Ontario, K2H 8C2	(613) 596-9432
C. Duncombe	TSC/Kendall Square, Cambridge, MA, 02142	(617) 494-2792

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. Under preparation.

b.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

Two implementations of a DECOR data modem were operated in an aeronautical satellite environment to evaluate effect of specular and diffuse multipath on bit error rate performance. The modem bit rates used were 1200 and 2400 bps.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

Analysis to date suggests that objectives have been reached. Tape recorder difficulties reduced useful data to about 80 percent of original expectations. Curves are being prepared showing deterioration in error rate performance as a function of multipath condition.

SURVEY FORM FOR ATS USERS

2-031

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No

The modems used have proved themselves to be state-of-the-art designs which would be used in such systems as the aeronautical satellite system.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

SURVEY FORM FOR ATS USERS

AUG 18 RECD

1. NAME: L.A. Maynard

2. ADDRESS: Communications Research Centre
P.O. Box 11490, Station 'H', Ottawa, Ontario, K2H 8S2

2-[illegible]
a-6 6

3. TITLE OF EXPERIMENT:
Aeronautical Satellite Tests (1) Voice Modems (2) Aircraft Antennas

4. DATE STARTED: September 1974 DATE ENDED: February 1976

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☒ ATS-6 ☐ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☒ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☐ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT:

1. To carry out a comparative evaluation of voice modem performance under conditions representative of those found in an Aeronautical Satellite system.

2. To carry out a comparative evaluation of antenna performance under conditions representative of those found in an Aeronautical Satellite system.

8. PARTICIPATING ORGANIZATION: Communications Research Centre

ADDRESS: P.O. Box 11490, Station 'H', Ottawa, Ontario, K2H 8S2

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
J.H. Chinnick	Communications Research Centre, P.O. Box 11490, Station 'H', Ottawa, Ontario, K2H 8S2	(613) 596-9449

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. J.H. Chinnick, D. Burtt, "Canadian Aeronautical Satellite Tests Using the ATS-6 Satellite - 1974-1975", CRC Technical Report, 1977.

b. J.H. Chinnick, D. Burtt, "Canadian Aeronautical Satellite Tests Using the ATS-6 Satellite - January 1976", CRC Technical Note, 1977.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

1. Four representative voice modulation techniques, narrow band frequency modulation, delta modulation, pulse duration modulation and a zero-crossing (band limiting) PSK technique were evaluated in airborne trials using MRT and PB word list scales under varying conditions of ocean multipath and carrier-to-noise density ratios in the range 40 to 49 dB-Hz.

2. The performance of two types of aircraft antenna systems was evaluated. One was a system of low gain antennas requiring three elements located on the aircraft, the optimum being switch selected, and the second was a 9 element linear phased array with automatic beam steering.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

1. The delta modulation and zero-crossing type modulation schemes were determined to give better than 80% intelligibility at C/No values greater than 40 dB-Hz.

2. The phased array antenna provides a gain value of better than 8 dB and a multipath discrimination ratio of better than 13 dB over 90 percent of that part of the upper hemisphere above 10 degrees elevation. This is a 3 dB gain improvement over the combined low gain element performance.

SURVEY FORM FOR ATS USERS

Z-032

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No

The phased array antenna is a very viable candidate for a high gain aircraft antenna in an aeronautical satellite system.

The two best voice modems tested have proved themselves to be among the best four voice modems available for an aeronautical satellite system.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

We have always found NASA personnel to be very helpful and co-operative in the planning and operational phases of all experiments.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

Another ATS satellite should provide a high gain, wide area coverage transponder at L-band frequencies, retaining previous C X L mode capabilities.

SURVEY FORM FOR ATS USERS

AUG 24 REC'D

1. NAME: Lewis S. Carey, M.D.

2. ADDRESS: Chairman, Dept. of Diagnostic Radiology and Nuclear Medicine
University Hospital, University of Western Ontario,
London, Ontario, Canada

h
G

3. TITLE OF EXPERIMENT: **A Telemedicine Experiment (U-6) in Canada Using Hermes Satellite.**

4. DATE STARTED: October 19, 1976 DATE ENDED: February 25, 1977

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☐ ATS-6 ☒ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☐ g. Communications
- ☒ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT: To study the feasibility of conducting the practice of Telemedicine between a remote northern nursing station (Kashechewan), a northern base hospital (Moose Factory General Hospital), and a health science centre (University of Western Ontario)

8. PARTICIPATING ORGANIZATION:

	ADDRESS:
a) Communications Canada	Communications Research Centre, Shirley Bay, P.O. Box 490, Station A, Ottawa, Canada, K1N 8T5
b) Department of Health and Welfare (Ontario Regional Medical Services)	Union Electric Building, 370 Catherine St., Ottawa, Canada, K1A OL3
c) University of Western Ontario	London, Ontario, Canada.

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
Mr. W. T. Kerr, Manager, Communication Experiments	See a) above	613-596-9595
Dr. Norman L. Fraser	See b) above	613-995-6361
(continued on reverse)		

Earl S. Russel, M.D., Program Co-ordinator, Telemedicine U-6 Project	50 Normandy Gardens London, Ontario,Canada	519-471-4974
A.R. Kempton, M.D., Administrator, Moose Factory General Hospital	Moose Factory, Ontario	705-658-4544

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. In process of being compiled.

b.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

a) Configuration: one-way video between base hospital (Moose Factory) and health science centre (University of Western Ontario). Two-way audio and telephony channel (telecopier, EKG, electronic stethoscope) between remote nursing station, base hospital, and health science centre.

b) Time allocation: continuous uninterrupted spacecraft time - 8:00 a.m. until noon, every other morning for 19 weeks.

c) Content: 1) Teleconsultation between northern nurse and physicians at base hospital (audio) to discuss clinical diagnosis and management, to expedite transportation of patients and supplies and to allow communication between patient and relatives. 2) Teleconsultation for specialty medical services between physicians at base hospital and consultants at health science centre (audio and video). 3) Medical teledata transmission (EKG, X-Rays, live Ultrasound examinations of pregnant uterus, and live television fluoroscopy of the gastrointestinal tract). 4) Supervision of professional services - trained radiologic technician was solely responsible for radiologic services at the base hospital for a period of two months. All television fluoroscopy was done by the technician and supervised live by radiologist in London. Anaesthesia and Psychiatric counselling also remotely supervised.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

The major goals of the project were achieved.

1) CTS system provided high quality audio-visual transmission in black and white and colour.

2) Accuracy of remote interpretation of Medical teledata (X-Ray, Ultrasound images, Television Fluoroscopy, tissue slices - both paraffin and frozen sections, peripheral blood smears and bone marrow preparations), was over 90%.

3) Teleconsultation for purposes of medical diagnosis and management successfully carried out.

4) Teleconferencing for purposes of continuing education was done and seemed beneficial.

Duties and responsibilities of medical support personnel need to be sorted out in next program - regular service duties vs. telemedicine.

SURVEY FORM FOR ATS USERS

Z-033

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No Likely not. Not only are the ground stations for the Anik series satellites very costly, but the frequency range (4 to 6 gigahertz) would preclude placement of a ground station in the London area.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No Radiologic services (and other services involving image medical data) could be provided, in continuous fashion, by a registered technician under the supervision of a remote consultant. Clinical consultation for special problems relating to diagnosis and management can be done at a distance thus effecting a trade-off between telecommunication and transportation.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

Technical reports of R and D work done at NASA relating to image transmission (and other related areas) could be useful to planners of future programs.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

SURVEY FORM FOR ATS USERS

3-034

1. NAME: Dr. Earl C. Chamberlayne

2. ADDRESS: Fogarty Internation Center
Bldg 31, Rm 2C17
National Institutes of Health
Bethesda, MD. 20014

3. TITLE OF EXPERIMENT: Biomedical Research Communications

4. DATE STARTED: 1973 DATE ENDED:

5. SATELLITE DESIGNATION: [X] ATS-1 [X] ATS-3 [ ] ATS-5 [ ] ATS-6 [ ] CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. Maritime Traffic Control
- [ ] c. Broadcasting
- [ ] d. Data Transmission
- [ ] e. Educational Applications
- [ ] f. Law Enforcement
- [X] g. Communications
- [X] h. Medical/Health Applications
- [ ] i. Meteorology
- [ ] j. Navigation
- [ ] l. Other _____

7. OBJECTIVE OF EXPERIMENT: Facilitate scientist to scientist communications between research investigators; communications from isolated field study sites; bring the scientific conference to the scientists in their laboratories where all research data and co-workers are available.

8. PARTICIPATING ORGANIZATION: ADDRESS:

Research investigators throughout the coverage area from Australia to Alaska

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
Dr. WG Laver	Australian National University	011-11-62-49-2397
Dr. Robert Webster	St. Judes Hospital, Memphis, Tenn.	901-525-8381
Dr. Leon Rosen	University of Hawaii, Honolulu	808-732-7702

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. NONE

b.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

A feasability study to determine if satellite communications are useful to scientists conducting biomedical research studies. Discussions about current or planned research experiments are conducted by two or more investigators or by groups of scientists.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

1. Many research studies are more efficiently done, resulting in savings in research time and money.
2. Field studies at isolated sites are conducted successfully because of the scientific input from colleagues in base laboratories and elsewhere.
3. Emergency messages can be conveyed.

SURVEY FORM FOR ATS USERS

Z-054

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No

Under present budget situation, no funds available to pay for commercial services.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No

If costs could be comparable to those of telephone.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

We experience many technical problems in operation, for which NASA might provide a continuous advisory service.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

-ATS-3 should be moved east to provide coverage for Europe and part of Africa.
-Move ATS-1 slightly west to cover all of Australia, Philippines, Tiawan, and Japan.
-Make available use of high quality antennae in the Washinton area and in California.

SURVEY FORM FOR ATS USERS

SEP 1 RECT

1. NAME: This survey was completed by Dr. R.F. Donnelly, on behalf of Dr. K. Davies
Dr. K. Davies, Radio Beacon Principle Investigator

2. ADDRESS: Space Environment Laboratory
~~NOAA Environmental Research Laboratories~~
Boulder, CO 80302

3. TITLE OF EXPERIMENT: Radio Beacon Experiment

4. DATE STARTED: June 1974 DATE ENDED: Still in progress

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☒ ATS-6 ☐ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☐ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☒ l. Other Ionospheric Research

7. OBJECTIVE OF EXPERIMENT:
To measure the total electron columnar content N_t, the ionospheric electron content N_F, and the plasmaspheric electron content, and to record amplitude and phase scintillations at VHF and UHF.

8. PARTICIPATING ORGANIZATION(s):* ADDRESS:

National Oceanic & Atmospheric Administration, ERL/SEL, Boulder, Colorado 80302

Max-Planck-Institut fuer Aeronomie, Lindau/Harz, West Germany

Physical Research Laboratory Ahmedabad, India

*Numerous organizations participated in ground-based recordings of the ATS-6 Beacon transmissions see the enclosed table.

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
Dr. G. K. Hartmann	Max-Planck-Institut für Aeronomie, D-3411 Lindau/Harz, W.Germa	
Dr. R. Rastogi,	Physical Research Laboratory, Ahmedabad, India	
Dr. R. Leitinger,	University of Graz, Graz, Austria	

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. See the enclosures, which list the papers from several of the groups we worked closely with. Because other groups operated ground stations independently of NOAA and NASA, we have not been informed of all their publications. For example, during
b. Phase I of ATS-6, a group from the U.S.S.R. made recordings in Cuba.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

The Radio Beacon transmits phase-coherent continuous waves at carrier frequencies of 40.016 MHz, 140.056 MHz, and 360.144 MHz and at the major sideband frequencies of 40.11604 MHz, 41.0164 MHz, 141, 0564 MHz, 360.24404 MHz and 361.1444 MHz. The phase and amplitide of the right and left-hand circular polarized waves are recorded at a number of different ground stations and intercompared so as to provide a measure of (1) the total columnar electron contnet from the satellite to the ground station, (2) the Faraday rotation, which is used to determine the ionospheric content to an altitude of about 2000 km, and (3) the plasmaspheric content above 2000 km, and (4) amplitude and phase scintillations.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

The ATS-6 Radio Beacon Experiment provided the first intensive plasmapsheric electron content measurements and the first extensive equatorial measurements of total electron content.

For maximum benefit a satellite radio beacon should emit continuously and should be free of positional maneuvers. This was not accomplished by the ATS6 satellite so that long term studies of TEC morphology were difficult to carry out. The large numbers of experiments on board ATS6 required frequent repositioning of the satellite as well as switching off the radio beacon. This resulted in difficulties in the determination of the plasmapsheric content and, furthermore, led to ground reflection effects depending on the type of receiving antennas used.

SURVEY FORM FOR ATS USERS

2-075

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No The scientific experiments involved are of great importance to the U.S. Government, e.g. to provide data for radar corrections for the Air Force, to provide corrections for satellite navigation systems, etc. Commercial satellites are unlikely to conduct such basic research studies because they have been mainly funded by the U.S. Government in recent years.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No The scintillation data currently under study should influence future designs of communications satellites. The corrections for the influence of the ionosphere on satellite navigation systems currently being developed should benefit navigation systems for commercial use.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

Radio Beacon transmissions should be continuous. The ATS-6 Beacon was frequently turned off because the power was needed for other experiments. NASA should design the satellites to have sufficient power available.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

Most ground stations for the Radio Beacon Experiment were provided by organizations other than NASA. If the ATS Series were continued, NASA should consider supporting ground-station observations by several Universities.

SURVEY FORM FOR ATS USERS

1. NAME: Norman Abramson

2. ADDRESS: THE ALOHA SYSTEM
University of Hawaii
Honolulu, Hawaii 96822

d-16

3. TITLE OF EXPERIMENT: Packet Broadcasting

4. DATE STARTED: 1973 DATE ENDED: continuing

5. SATELLITE DESIGNATION: [X] ATS-1 [ ] ATS-3 [ ] ATS-5 [ ] ATS-6 [ ] CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. Maritime Traffic Control
- [ ] c. Broadcasting
- [X] d. Data Transmission
- [ ] e. Educational Applications
- [ ] f. Law Enforcement
- [ ] g. Communications
- [ ] h. Medical/Health Applications
- [ ] i. Meteorology
- [ ] j. Navigation
- [ ] l. Other _____

7. OBJECTIVE OF EXPERIMENT: To verify the possibility of using existing satellites for packet broadcasting multiple access.

8. PARTICIPATING ORGANIZATION: ADDRESS:

THE ALOHA SYSTEM	University of Hawaii, Honolulu 96822
[illegible]okjer, Department of Electrical Engineering	University of Alaska, College, Alaska 99701
Dr. Dale Lumb NASA	Ames Research Center, Moffet Field, Calif.

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. Norman Abramson, "Packet Switching With Satellites," Proceedings of the National Computer Conference, New York, June 1973; reprinted in Advances in Computer Communications, W. W. Chu, editor, ARTECH House, Inc., 1974; reprinted in Computer Communications, Paul Green and Robert Lucky, editors, IEEE Press, 1975.

b. Norman Abramson and Eugene R. Cacciamani, "Satellites: Not Just a Big Cable in the Sky," IEEE Spectrum, Vol. 12, No. 9, September 1975, pp. 36-40.

c. R. Binder, N. Abramson, F. Kuo, A. Okinaka, D. Wax, "ALOHA Packet Broadcasting - A Retrospect," AFIPS Conference Proceedings, Vol. 44, 1975 National Computer Conference, May 1975, pp.203-216.

d. Norman Abramson, "The Throughput of Packet Broadcasting Channels," IEEE Trans on Communication Systems, January 1977.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

Data packets from Hawaii, Alaska and California were transmitted in packet broadcasting mode to establish a fully connected information network.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

Demonstrated the feasibility of this new form of communications architecture.

SURVEY FORM FOR ATS USERS

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

[X] Yes [ ] No

Similar experiments are now in progress on the Atlantic Ocean INTELSAT IV.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

[X] Yes [ ] No

The packet broadcasting technique first used in THE ALOHA SYSTEM experiment is now used on the request channel for the MARISAT satellite.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

By restoring its research program in satellite communications

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

Satellite - High power, low duty cycle, burst transponders

Ground capabilities - Small, low cost earth station, for data communication

SURVEY FORM FOR ATS USERS

SEP 12 REC'D

1. NAME: Miss Judy Roberts, Research Associate/Co-ordinator

2. ADDRESS: Telemedicine Office
Faculty of Medicine
Memorial University of Newfoundland
St. John's, Newfoundland, Canada

11-6

3. TITLE OF EXPERIMENT:
Telemedicine Project

4. DATE STARTED: March 28, 1977 DATE ENDED: June 18, 1977 (Broadcast Dates)

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☐ ATS-6 ☒ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☐ g. Communications
- ☒ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT:
To determine whether continuing education could be delivered to health care professionals by 1-way video and 2-way audio without requiring travel by the recipients or the tutors.

8. PARTICIPATING ORGANIZATION: ADDRESS:

Faculty of Medicine	Memorial University of Newfoundland
Educational Television	Memorial University of Newfoundland

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
Dr. A.M. House	Faculty of Medicine, M.U.N.	737-6653
Mr. W.C. McNamara	Educational Television, M.U.N.	753-1200 ext. 2157

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. A.M. House, M.D., Assistant Dean, Continuing Medical Education; J. Roberts, Research Associate/Co-ordinator. "Telemedicine at Memorial University of Newfoundland". Newsletter - Newfoundland Medical Association - Vol. XVIII, No. 5, November, 1976.

b. A.M. House, M.D., F.R.C.P.(C); & J.M. Roberts, B.A.(Hons.), M.A., "Telemedicine in Canada". Canadian Medical Association Journal - August 20, 1977; Vol. 117, No. 4

c. Judith M. Roberts; A. Maxwell House; and W. Craig McNamara: "Telemedicine at Memorial University of Newfoundland". MEDINFO 77, Shires/Wolf, editors; IFIP, North-Holland Publishing Company (1977).

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

The Memorial University Telemedicine project utilized the communications technology satellite Hermes for approximately five hours daily on alternate days for a period of twelve weeks from the first of April to the middle of June, 1977. The experiment, which received direct funding from the Department of Communications and indirect support in the nature of personnel time and facilities from Memorial, was a joint effort of the Faculty of Medicine and the Educational Television Center.

The main thrust of the experiment was in continuing education for physicians and allied health professionals. In addition, the satellite system was used in a limited way to provide medical consultations at a distance. This activity included the transmission of medical data, particularly slow scan. Thirdly, there was a community health education component with the main theme of nutrition for a variety of professionals such as dietitians and social welfare officers but some programmes were directed to patients and community groups.

The system was composed of a 3-point network in St. John's linked by cable and microwave and four participating hospitals, two on the island at Stephenville and St. Anthony, and two on the Labrador part of the province at Labrador City and Goose Bay. Video and audio were transmitted from St. John's with audio only being returned from the four receiving hospitals. In addition, Labrador City had the capability of transmitting slow scan by a separate telephony channel and St. Anthony could remotely control a television camera located in St. John's General Hospital.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

Our evaluation is not completed at this time and it is therefore not possible to comment on these matters.

SURVEY FORM FOR ATS USERS

2-037

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No

Our broadcasting on Hermes is now completed and we would not be able to consider using any satellite unless we received outside funding.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☐ Yes ☒ No

As our evaluation data is not completely analysed, we cannot comment on whether we have even "demonstrated" any principles.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

Not applicable to us as Canadian experimenters.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

Not applicable to us as Canadian experimenters.

SURVEY FORM FOR ATS USERS

2-038

1. NAME: J. Kaiser

2. ADDRESS: c/o COMSAT Labs
22300 Comsat Dr.
Clarksburg, MD 20734

3. TITLE OF EXPERIMENT: Highly Transportable Earth Station

4. DATE STARTED: 2-76 DATE ENDED: ---

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☐ ATS-6 ☒ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☐ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☒ l. Other Disaster Relief Communications

7. OBJECTIVE OF EXPERIMENT:

To demonstrate feasibility of restoring communications in the event of a natural disaster, for disaster relief work.

8. PARTICIPATING ORGANIZATION: National Red Cross

ADDRESS: 18th & E St. N. W.
Washington, D. C. 20006

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
M. Fink	18th and E Sts. N. W.	202-857-3535
Chief, Emergency	Washington, D. C. 20006	
Communications, Nat'l Red Cross		

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a.

b.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

A small, highly transportable earth terminal with 1.2 m diameter antenna on tripod was constructed. Tests were made in transmission of voice, teletype and facsimile between that terminal located in simulated and real disaster situations and a larger terminal at Clarksburg, MD. via CTS. Links were then completed to Red Cross facilities etc. via commercial telephone network.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

Successfully demonstrated transportability, usefulness and technical capabilities of system.

SURVEY FORM FOR ATS USERS

2-033

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No For disaster communications.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

Provide next generation of CTS like space-craft.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

SURVEY FORM FOR ATS USERS

2-039

1. NAME: C. A. Siocos

2. ADDRESS: Canadian Broadcasting Corporation
7925 Cote-Saint-Luc Road
Montreal, PQ, Canada, H4W 1R5

3. TITLE OF EXPERIMENT: No. F.2.1.0: Technical Measurements and Demonstrations, Broadcasting Signal Reception in a Metropolitan Environment

4. DATE STARTED: July 26, 1976 DATE ENDED: November 25, 1976

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☐ ATS-6 ☒ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☐ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☒ l. Other _____

7. OBJECTIVE OF EXPERIMENT:

1. To evaluate a community-reception link and
2. To demonstrate direct-to-home satellite broadcasting of television.

8. PARTICIPATING ORGANIZATION: ADDRESS:

See 2 Above

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. C. A. Siocos, "Broadcasting Satellite Experiments", E. B. U. Review-Programmes et al., Vol XXVIII, May 1977, pp. 59-62.

b. J. W. Edens, "Experience with and Some Aspects of Reception of Direct Television Broadcasts from Satellites", E. B. U. Review-Technical, No. 162, April 1977.

c. K. G. Freeman, "Experimental Direct Broadcast Reception of 12 GHZ Television Signals from the Canadian Communications Technology Satellite", Radio and Electronic Engineer, Vol. 47, No. 5, May 1977.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

1. Regular measurements of the technical quality and observation of the reliability of CTS television signals received by professional and semi-professional types of installations.

2. Demonstrations of reception of CTS television signals by compact, simple and potentially low-price receivers and antennas representative of home-entertainment type of equipment which would be used for receiving television at home directly from a satellite.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

Good-quality and sufficiently reliable reception was achieved. A variety of very simple domestic reception protoype equipment with parabolid antennas ranging from 0.6 to 1.2 meters in diameter were successfully demonstrated.

SURVEY FORM FOR ATS USERS

2-03

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☐ No

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No

Broadcasting-from-satellites technology was successfully demonstrated in action. It is applicable to use by the public and by groupings such as cable TV enterprises.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

By publicly inquiring and discussing requirements and objectives before progressing too far in the design of its satellites.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

SURVEY FORM FOR ATS USERS

1. NAME: Robert B. Shamaskin

2. ADDRESS: Deputy Director, Learning Resources Service (142A)
VA Central Office
810 Vermont Avenuew, N.W.
Washington, DC 20420

D-288
ATS-6
e-h

3. TITLE OF EXPERIMENT: Health/Education Telecommunications Experiments HET

4. DATE STARTED: ATS-6 7/10/74
CTS 10/14/76
DATE ENDED: ATS-6 5/20/75
CTS December 1978

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☒ ATS-6 ☒ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☒ e. Educational Applications
- ☐ f. Law Enforcement
- ☐ g. Communications
- ☒ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT: The overall goal of the ATS-6 experiment was to determine whether satellite-mediated communications have a place in the VA health care delivery system.

CTS - Purpose is to determine if communications satellites can be employed in a cost effective manner in exchange of medical information for diagnostic, therapeutic, edvcational and administrative purposes.

8. PARTICIPATING ORGANIZATION: ADDRESS:
ATS-6: VAH Altoona, PA; Asheville, NC; Beckley, W.Va.; Clarksburg, W.Va.; Dublin, GA; Fayetteville, NC; Mountain Home, TN; Salem, VA; Salisbury, NC; Wilkes-Barre, PA.

CTS: 30 VA hospitals in the Rocky Mountain and Pacific Coast regions, up to 10 non-VA hospitals, including 5 community hospitals in California, two Alaska Area Native Health Service Hospitals and the Indian Medical Center Gallup, NM.

9. OTHER PEASONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

1. Shamaskin, Robert B. and Caldwell, Kathryn S., Ph.D. "Satellites in Exchange of Medical Information, " Biomedical Communications, Vol. 2 No. 4, July 1974
2. Shamaskin, Robert B. "The Appalachian Program in Bio-medical Communications," Proceedings - First Canadian Telemedicine Symposium, October 1975
3. "Space Age Comes to VA," Veterans of Foreign Wars Magazine, Vol. 62 No. 8, April 1975
4. Domm, M.D., Bill M. and Shamaskin, Robert T. "Veterans Administration Satellite Transmitted Experiments in Biomedical Communications," AIAA Paper No. 75-899
5. Shamaskin, Robert B. and Caldwell, David E., "Advanced Bio-medical Applications to Satellite Communications," AIAA Paper No. 75-912
6. Caldwell, Kathryn S., Ph.D., "The Veterans Administration Experiment with the Applications Technology Satellite-6: Final Report," February 1976
7. Shamaskin, Robert B. "Barriers of Time and Distance Have Disappeared," UPLINK, Vol. 1 No. 1, April 1977
8. Shamaskin, Robert B. "Communications Satellites and Medicine," Educational and Industrial Television, Vol. 9 No. 5, May 1977

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

In ATS-6, five categories of types of communications were employed to present selected subjects for target audiences, as appropriate, physicians, nurses, LPNs, nursing assistants, patients, and families of patients. They were: Grand Rounds; Video Seminars; Computer Assisted Instruction; Outpatient Clinics for Patients and Families; Teleconsultations - Slow Scan; both black-and-white and color were used for slow scan or compressed video transmissions.

CTS programs will concentrate in six areas: Teleconsultations; VA National Medical Satellite Journal; Patient Education; Continuing Education for Professionals; Allied Health Programming and Management/Teleconferences.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

See attached: "The Veterans Administration Experiment With the Applications Technology Satellite-6: Final Report," Section VI.

Final report on CTS experiements will be available from the Veterans Administration in June 1979.

C-4

SURVEY FORM FOR ATS USERS

Z-040

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

NASA has been most helpful. I have no further suggestions.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

SURVEY FORM FOR ATS USERS

2-347
1-3
E-A

1. NAME: Rev, Douglas B. Millar

2. ADDRESS: Box 275
Rutland, N. Dakota 58067

3. TITLE OF EXPERIMENT: Educational uses of Satellite Communication for American Lutheran Church

4. DATE STARTED: Nov. 1975 DATE ENDED: Continuing

5. SATELLITE DESIGNATION: [X] ATS-1 [X] ATS-3 [ ] ATS-5 [ ] ATS-6 [X] CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- [ ] a. Air Traffic Control
- [ ] b. Maritime Traffic Control
- [ ] c. Broadcasting
- [ ] d. Data Transmission
- [X] e. Educational Applications
- [ ] f. Law Enforcement
- [ ] g. Communications
- [ ] h. Medical/Health Applications
- [ ] i. Meteorology
- [ ] j. Navigation
- [ ] l. Other _____

7. OBJECTIVE OF EXPERIMENT:
to provide educational resources for isolated Church units with portable, inexpensive terminals and evaluate its effectiveness.

8. PARTICIPATING ORGANIZATION: ADDRESS:

PARTICIPATING ORGANIZATION:	ADDRESS:
American Lutheran Church	422 So. 5th St., Minneapolis, Minn
ALC Media Services Center	1568 Eastis, St. Paul, Minn.

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
Mr. Douglas Tave	Media Services Center	(612) 645-9173
Rev. Ron Lundun	Des Moines, Iowa	
Wistchester Lutheran Church	Los Angeles, Calif.	

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. the Lutheran Standard - 2 articles Fall 1976

b. "FATS" Publication of ALC Youth Department, Aug. 1966

c. Sargent Countyteller, April 1966

d. Video tape of demonstration at UN Habitat Conference available from Eldon Volkmen, Code 951 65FC Greenbelt, Md.

e.

*Please send copies of the above items as available Contact the Media Services Center

11. DESCRIPTION OF EXPERIMENT

To explore ways in which we can draw together resources and needs for education in the American Lutheran Church.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

We have been able to demonstrate, on a number of occasions, the practical uses of this type of communication to both large and small groups. As a result the ALC is increasingly interested in boradening its use of satellite communication.

However, we have had difficulties in two areas. It took almost a year to receive our FCC lisencing and we have had uneven results receiving signals from the satellite.

SURVEY FORM FOR ATS USERS

2-041

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No Difficult - because ATS-1 & 3 are accessable through simple and inexpensive terminals on frequencies for which such equipment is available. Commercial satellites do not provide for this possibility.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No

With greater public awareness the volume of use would make a satellite similar to ATS-1, operationally, commercially feasible.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

Have more funds available for special events, demonstrations such as UN Water Conference in Argentina. Provide coverage of the "Eastern Hemisphere"- Africa India with interlinking of satellites possible so that for instance New Zealand stations could access stations in Africa.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

Continue use of small, inexpnesive terminals.

1. NAME: Michael G. Ryan, Ph. D.

2. ADDRESS: Secretariat Services
Public Service Commission
1725 Woodward Drive, Ottawa

e-A

3. TITLE OF EXPERIMENT: Staff Training by Satellite

4. DATE STARTED: July 1975 DATE ENDED: September 31, 1977

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☐ ATS-6 ☒ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☒ e. Educational Applications
- ☐ f. Law Enforcement
- ☐ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT: The objectives of Staff Training by Satellite were:

- develop educational Telecommunications as an educational tool, i.e. from a one-way teacher-centred communications system to a multi-way learner-centred system;
- explore, through the development of learning methods via satellite, new or improved methods of professional development for the public service;
- investigate the possibilities of providing managerial or language training for public servants via satellite technology thus allowing them to remain in their home offices or home location while participating in courses;
- study those aspects of human telecommunication which may encourage or hinder learning.

Z-042

8. PARTICIPATING ORGANIZATION: ADDRESS:

Department of Communications	300 Slater, Ottawa
Memorial University	St. John's, Nfld., (contractor)
Miller Communications Systems	39 Leacock Way, Kanata, Ottawa (contractor)

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
Nicole Mendenhall, PSC	1725 Woodward Dr., Ottawa	998-3823
Glenn Barker, PSC	1725 Woodward Dr., Ottawa	998-3650 (course)
Jerzy Jamarsz, PSC	300 Laurier, Ottawa	995-2624 (eval.)
René Lortie, PSC	1725 Woodward Dr., Ottawa	998-3823 (instructional advisor)

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

Barker, Glenn and McCoy, Terry. A simulation of staff training by satellite, Canadian Training Methods, February 1977.

Frenette, Charlotte, Satellite and Staff Training, June 1976. Paper presented at AMTEC, St. John's, Newfoundland.

Lortie, René, Problèmes pratiques dans un domaine nouveau: Formation non-directive via Satellite, Mai 1976.

Mendenhall, Nicole and Lortie, Rene, Evaluation of Interactive Tele-Education in the Public Service Commission. Submitted for presentation at the NATO Symposium on "The Evaluation and Planning of Interpersonal Telecommunications Systems". Bergamo, Italy. September 5 - 9, 1977.

Ryan, Michael and Mendenhall, Nicole, Canadian Satellite Experiments, Implications for Human Communication. December 29, 1975. Presented to the Speech Communication Association, Houston, Texas.

Ryan, Michael, Staff Training by Satellite, year February/March, 1976. Info-Etudes

Ryan, Michael and Mendenhall, Nicole, Interaction, A Canadian Theme in Education by Satellite. July 11, 1976. Presented to the World Educations Conference, Honolulu, Hawaii.

Ryan, Michael and Jean, Guy, The Impact of the Communications Technology Satellite on a Government Organization, May 29 - June 24, 1977.

2-042

Presented to International Communication Association, West Berlin, Germany.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

From April to June, 1977 groups of 25 participants in the Public Service Commission's training by satellite experiment followed two consecutive management courses using a five location satellite-mediated link. One subgroup of five, including a resource-person, met in Ottawa, and four subgroups met in St. John's, Newfoundland, approximately 1000 miles from Ottawa.

Each group worked out of a center, which included four monitors, each with a video feed from one of the other four learning centers. Each center also provided a camera, a microphone, loud-speaker system and appropriate furniture for five participants. Using this equipment, participants of any group maintained continuous visual contact and communicate with any other group. A face-to-face control group met in Ottawa.

These five learning centers were connected by a combined system of satellite, microwave and cable. The Ottawa learning center, established in Esplanade Laurier, a downtown office building, was joined by coaxial cable with a microwave system capable of carrying two-way audio-video. The microwave link connected Esplanade Laurier with the nine meter CTS ground station at Shirley Bay, some 15 miles away. The CTS satellite connected this nine meter ground station with a three meter portable ground station at Memorial University, St. John's, Newfoundland. Coaxial cable joined the ground station with four learning within the Memorial University Education Building. Four return video images were multiplexed to Ottawa by means of a line interlace system developed by Miller Communications Systems Ltd.

Central to this experiment was the development of non-directive learning, that is, learning through group interaction, with the assistance of someone who works as a resource-person rather than a teacher. Non-directive learning situations can best be achieved if participants on the system communicate freely with each other in an unhampered manner.

Evaluation indicated no significant statistical difference on learning between mediated and face-to-face groups. Analysis on reactions to media, user satisfaction, evaluation of methodology and other related evaluations are being continued.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

1) Video multiplex system

2) Study of personality factors and media reactions

3) Five node interactive audio-video system applied in a field situation

4) Non-directive learning over a mediated system

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No We used an audio teleconferencing system as back up in case of satellite failure. In the case of partial failure we used satellite carried video one way and used two way satellite carried audio.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No

1. The video multiplexing system could cut transmission costs by four yet provide images satisfactory for teleconferencing or tele-education.

2. Multi-point interactive system for educational application is feasible

15. HOW COULD DOC BE MORE HELPFUL TO SATELLITE USERS?

DOC consistantly provided excellent service to this experiment. A few points might improve that service even more.

1. Provision of more information on problems incountered with the satellite.

2. Provision of back-up system in case of satellite failure.

3. Technical research and development should be assumed by DOC, such as the development of multiplexing system.

16. IF THE CTS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

- This was quite satisfactory. The mobile ground stations were most useful.
- If a microwave system is needed, it should be made available along with ground terminal equipment.
- Greater accessibility to 3 meter terminals so as to eliminate sharing of terminal.

SURVEY FORM FOR ATS USERS

1. NAME: N. W.Willett

OCT 03 RECD

2. ADDRESS: P. O. Box 7158
Austin, Texas 78712

B-6

3. TITLE OF EXPERIMENT: Satellite Distribution Experiment

4. DATE STARTED: December 1976 DATE ENDED: On-going

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☐ ATS-6 ☒ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☒ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☐ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT:
Distribution of educational television materials originate at a central location for broadcast use by non-commercial TV stations

8. PARTICIPATING ORGANIZATION: Southern Educationa Communications Assocation

ADDRESS: P. O. Box 5966
Columbia, S. C. 29250

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
Forrest L. Morris	P. O. Drawer 1101 Jackson, Miss. 39205	601/982-6565
Dr. John Fryman	University of Texas Radio/TV Dept. Austin, Texas 78712	512/471-4071

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. Willett, THE USE OF SATELLITES IN BROADCASTING IN THE U.S.A, International Communications Association in Berlin, May, 1977

b. Willett & Fryman, ON TRIAL: SATELLITES VS. TERRESTIAL MICROWAVE, BM/E, October 1976

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT The SECA experiment is designed to determine the feasibility of satellite distribution of program material to television stations for re-broadcast purposes.

Objectives of the experiment are to determine the feasibility of using high-power satellites, such as CTS, coupled with relatively inexpensive ground terminals for distribution of program material to television stations; to gain experience with this means of communications by actual distribution of programs on a scheduled basis; and to assess the results obtained and cost of service as compared to terrestial distribution means.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

Because the Rosman, North Carolina, uplink facility is not yet complete, all program origination must be from tapes shipped to Lewis which has restricted the choice of available program meterial to be used in the experiment. When the Rosman uplink is on-line, more programs, including live broadcasts, will be carried from Columbia, South Carolina via private microwave to Rosman and hence the rest of the CTS network.

Technical quality of the programs transmission system (CTS) has exceeded normal expectations.

SURVEY FORM FOR ATS USERS

2-043

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No There is no other satellite available using 12 GHz, 200 watt transponders to be compatable with existing station owned three or five meter antennas.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No The technical quality of the received signal is better, more channels would be available, the overall system cost would be less expensive.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

Provide more low cost or free satellite time; provide more channels on satellites; provide more higher power satellites to facilitate using smaller, less expensive earth stations.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

SURVEY FORM FOR ATS USERS

OCT 1 1 1976

2-044
d-g 3
G #

1. NAME: T. K. Treadwell

2. ADDRESS: ~~Oceanography Dept.~~
Texas A&M University
College Station, TX 77843

3. TITLE OF EXPERIMENT: GYRE

4. DATE STARTED: March 13, 1976 / January 20, 1977 DATE ENDED: September 20, 1976 / present (continuing)

5. SATELLITE DESIGNATION: ☐ ATS-1 ☒ ATS-3 ☐ ATS-5 ☐ ATS-6 ☐ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☒ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT:

To determine feasibility of using various modes of data transmission via ATS satellite.

To provide communication between research vessels at sea and support facilities on shore to coordinate N.S.F. sponsored research programs.

8. PARTICIPATING ORGANIZATION: Texas A&M University ADDRESS:

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
None		

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a. Report submitted to NASA January 1977.
"Report on Communications Experiments Utilizing VHF Channel on ATS-3" by A. Payne, Texas A&M.

b.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

Ground stations have been established in College Station, Texas and Galveston, Texas and on board the R/V GYRE. Communications between these stations and other oceanographic stations are conducted daily. Some facsimile transmissions have been conducted. Other data transmission experiments await completion of equipment.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

Reliable communications channels have been established between the research expedition at sea and support facilities (including computers) on shore. Conventional modes of communications have not been sufficiently reliable for data transmission. More efficient and expedicious use of ship facilities are permitted.

SURVEY FORM FOR ATS USERS

2-044

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☐ Yes ☐ No

Too early to evaluate, but probably not.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

They are doing fine with this current operation.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

Continue with VHF channels.
Provide one channel for calling and short messages 24 hours per day.

1. NAME: US Army Training Support Center

2. ADDRESS: Commander
US Army Training Support Center
Fort Eustis, VA 23604

e-N
6

3. TITLE OF EXPERIMENT: None designated

4. DATE STARTED: N/A DATE ENDED: N/A

5. SATELLITE DESIRED DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☒ ATS-6 ☐ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☒ e. Educational Applications
- ☐ f. Law Enforcement
- ☐ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT: To test cost effectiveness and training effectiveness of interactive training in remote areas via satellite.

8. PARTICIPATING ORGANIZATION: ADDRESS:

PARTICIPATING ORGANIZATION:	ADDRESS:
US Army Training Support Center	Fort Eustis, Virginia

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE
None		

Encl 1

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a.

b.

N/A

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

Not developed

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

N/A

SURVEY FORM FOR ATS USERS

2-345

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☐ No

N/A

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☐ Yes ☐ No

N/A

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

NASA has been extremely cooperative with us in our endeavors to develop a total program.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

Based upon our limited involvement, it would appear that the availability and number of ground terminals should be increased.

SURVEY FORM FOR ATS USERS

1. NAME:
Dr. S.S. Haykin/Dr. D.P. Taylor

2. ADDRESS: Communications Research Laboratory
McMaster University
Hamilton, Ontario, Canada, L8S 4L7

SC-d
6

3. TITLE OF EXPERIMENT:
High-Rate Data Transmission

4. DATE STARTED: 1974 DATE ENDED: 1977

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☐ ATS-6 ☒ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☒ d. Data Transmission
- ☐ e. Educational Applications
- ☐ f. Law Enforcement
- ☐ g. Communications
- ☐ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other _____

7. OBJECTIVE OF EXPERIMENT:

To design, develop and evaluate the performance of a 60 Mb/s continuous mode modem employing the fast frequency-shift keying modulation technique.

8. PARTICIPATING ORGANIZATION: Communications Research Laboratory

ADDRESS: McMaster University,
1280 Main Street West,
Hamilton, Ontario, Canada. L8S 4L7

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a.

b.

- as per attached list -

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

The experiment was conducted in four stages as follows:

a) A comparative study by means of computer simulation of a variety of digital modulation techniques.
b) The design and construction of a prototype fast frequency-shift keying modem at a nominal data rate of 60 Mb/s.
c) An extensive laboratory test program on the modem including tests using a transponder simulator at a centre frequency of 11.265 GHz.
d) Extensive field testing of the modem using the CTS during June 1976 and May 1977.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

The experiment has demonstrated the high performance capability of the fast frequency-shift keying technique and also has demonstrated the simplicity, compared to conventional phase-shift keying, of construction of both modulator and demodulator. It has also shown the robustness of the technique in the presence of severe bandlimiting.

SURVEY FORM FOR ATS USERS

Z-046

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☒ Yes ☐ No

The experiment has shown that the fast frequency-shift keying modulation technique is a viable competitor to phase-shift keying for high-rate data transmission via satellite.

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

N/A

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

N/A

SURVEY FORM FOR ATS USERS

1. NAME: Alberta Native Communications Society

2. ADDRESS: 11427 Jasper Avenue,
Edmonton, Alberta.

In process of moving to: 9311 - 60 Ave., Edmonton

2-047

g-6

3. TITLE OF EXPERIMENT: Project Iron Star

4. DATE STARTED: July 18, 1977 DATE ENDED: March 1978

5. SATELLITE DESIGNATION: ☐ ATS-1 ☐ ATS-3 ☐ ATS-5 ☐ ATS-6 ☒ CTS

6. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☒ c. Broadcasting
- ☐ d. Data Transmission
- ☒ e. Educational Applications
- ☐ f. Law Enforcement
- ☒ g. Communications
- ☒ h. Medical/Health Applications
- ☐ i. Meteorology
- ☐ j. Navigation
- ☐ l. Other Interactive Communications

7. OBJECTIVE OF EXPERIMENT:

To develop communication programs for Native people in Northern Alberta.

8. PARTICIPATING ORGANIZATION: ADDRESS:

Department of Communications	Ottawa, Ontario
National Health & Welfare	Ottawa, Ontario
Indian Affairs	Ottawa, Ontario
Secretary of State	Ottawa, Ontario

9. OTHER PERSONS INVOLVED IN EXPERIMENT THAT SHOULD BE CONTACTED:

NAME	ADDRESS	PHONE

10. TECHNICAL REPORTS/JOURNAL ARTICLES*
(List by author, title, technical report number of journal citation, date)

a.

b.

c.

d.

e.

*Please send copies of the above items as available

11. DESCRIPTION OF EXPERIMENT

One-way video and two-way audio.

12. ACCOMPLISHMENTS OF EXPERIMENT (Give Positive and Negative Aspects)

With the immediate voice return we are able to adjust and polarize our programs in a manner in which they can understand what we are trying to get across.

Minor technical difficulties.

(Apathy in communities) - Natives look at radio and television as a form of entertainment rather than information.

13. IF THE SATELLITE YOU ARE PRESENTLY USING BECAME INOPERATIVE, WOULD THE EXPERIMENT BE CONTINUED ON A COMMERCIAL SATELLITE? EXPLAIN.

☐ Yes ☒ No

Too expensive for ground station and we could, with some inconvenience, use telephones.

14. DO YOU FEEL THE PRINCIPLES DEMONSTRATED IN THIS EXPERIMENT HAVE ANY COMMERCIAL APPLICATION? EXPLAIN.

☐ Yes ☐ No

Only for oil companies

15. HOW COULD NASA BE MORE HELPFUL TO SATELLITE USERS?

Launch satellite at a lower cost.

16. IF THE ATS SERIES IS CONTINUED, WHAT SATELLITE OR GROUND CAPABILITY SHOULD BE PROVIDED - IN TERMS OF HARDWARE OR FUNCTION?

In Canada we should have a lot of "receive only" ground stations because of the poor land system in the mid-Canada corridor.

Good transmitting facilities.

SURVEY FORM FOR ATS USERS

ATS & CTS INFORMATION SHEET

3-001

1. NAME: Dr. Kenneth N. Erickson PHONE NO: (612)373-3490

2. ADDRESS: School of Physics and Astronomy
University of Minnesota
Minneapolis, MN 55455

3. NASA EXPERIMENT NUMBER

4. TITLE OF EXPERIMENT: Particle Accelaration Measurements Experiment-Electron-Proton Spectrometer

5. DATE STARTED: June 14, 1974 DATE ENDED: June, 1976

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☐
ATS-6 ☒ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☐ a. Air Traffic Control	☐ f. Communications
☐ b. Maritime Traffic Control	☐ g. Medical/Health
☐ c. Broadcasting	☐ h. Meteorology
☐ d. Data Transmission	☐ i. Navigation
☐ e. Educational Applications	☒ j. Other Environmental Measurements

8. EXPERIMENT DESCRIPTION: The experiment was designed to investigate the origin of the Van Allen trapped radiation. The particle spectrometer obtained measurements of the intensity and time variations of protons and electrons in the vicinity of synchronous orbit and consisted of a magnetic deflection separation system and a solid-state particle counter system. The directional capabilities of the instrument also allowed the measurement of particle pitch angles. Proton energy ranges were 25 to 60 KeV, 60 to 150 KeV, and 150-500 KeV. Electron energy ranges were 30 to 50 KeV, 150 to 200 KeV, and greater than 500 KeV.

The Principal Investigator for the experiment is Dr. John R. Winckler.

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)
Please see enclosed bibliography.

SURVEY FORM FOR ATS USERS 3-002

ATS & CTS INFORMATION SHEET

1. NAME: Dr. Leonard S. Wagner PHONE NO: (202)767-2891

2. ADDRESS: Code 7561
Communications Sciences Division
Naval Research Lab., Washington D.C. 20375

3. NASA EXPERIMENT NUMBER 2

4. TITLE OF EXPERIMENT: Satellite Bistatic Radar

5. DATE STARTED: Sept. 1977 DATE ENDED: May 1978

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☐
ATS-6 ☒ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☐ a. Air Traffic Control	☐ f. Communications
☐ b. Maritime Traffic Control	☐ g. Medical/Health
☐ c. Broadcasting	☐ h. Meteorology
☐ d. Data Transmission	☐ i. Navigation
☐ e. Educational Applications	☐ j. Other Radar

8. EXPERIMENT DESCRIPTION:

The experiment made use of the ATS-6 UHF transmitter and selected ground receiving equipment in a system for demonstrating the capabilities and problems of satellite bistatic radar. ATS-6 was selected over other satellites because of its geostationary orbit and its relatively high EIRP. The very competent ground support facilities provided by NASA were also an important consideration in the choice of satellite.

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)

Project RANGER: A Satellite Bistatic Radar Experiment, L.S. Wagner, D.R. Uffelman, NRL Report to be published (confidential)

SURVEY FORM FOR ATS USERS

ATS & CTS INFORMATION SHEET

3-003

1. NAME: National Association for Search and Rescue PHONE NO: (714) 268-3266

2. ADDRESS: P.O. Box 2123; La Jolla, CA 92038

3. NASA EXPERIMENT NUMBER N/A

4. TITLE OF EXPERIMENT: Emergency Response Communications

5. DATE STARTED: DATE ENDED: Sept. 30, 1979

6. SATELLITE DESIGNATION: ATS-1 ☒ ATS-3 ☒ ATS-5 ☐
ATS-6 ☒ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☐ a.	Air Traffic Control	☒ f.	Communications
☐ b.	Maritime Traffic Control	☐ g.	Medical/Health
☐ c.	Broadcasting	☐ h.	Meteorology
☐ d.	Data Transmission	☐ i.	Navigation
☐ e.	Educational Applications	☐ j.	Other _____

8. EXPERIMENT DESCRIPTION:

(Please see attached sheet)

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)
The report of the Emergency Response Communications Program, distributed by the Interagency Committee for Search and Rescue (ICSAR), June, 1979.

NATIONAL ASSOCIATION FOR SEARCH AND RESCUE

HEADQUARTERS: P.O. BOX 2123, LA JOLLA, CA 92038

ARTHUR G. JONES
President
LA DOTD, Office of Aviation

PETER R. JENSEN
1st Vice President
Wisconsin

J.W. "BILL" WADE
2nd Vice President
Tennessee

THOMAS A. STAADT
Secretary/Treasurer
Illinois

LOIS CLARK McCOY
Administrator
(714) 268-3266

8. EXPERIMENT DESCRIPTION:

This is a mobile, rapid response, emergency communications experiment involving a base station for ATS-6 at Scott AFB, Ill., the headquarters of the U.S. Air Force Inland Search and Rescue Coordinator. In addition we have 2 Air Force Reserve jeeps with all terrestial communications capabilities plus a transceiver on ATS-6. In addition we have, on loan from NASA, three brief-case units on ATS-6. This system has been deployed for 6 national coverage site experiments including Raleigh, N.C., McClennan AFB, CA, U.S.C.G. Academy, New London, CT. and Eglin AFB, FL. In addition a Search and Rescue exercise (SARX) and simulated Search and Rescue scenario spanning 3 days was undertaken in conjunction with the State of California, the National Park Service, and Lemoore Naval Air Station. The Air Force participated in the experiment with a full scale, 3-day exercise at Keesler AFB, Biloxi, MS. This included mock strategic deployment of satellite communications in simulations of Jonestown and Zaire operations.

The most interesting experiment was the rapid deployment of the experimental satellite equipment to the tornado devastated area of Wichita Falls, TX and the state capitol in Austin. With this satellite communications link augmenting the single surviving telephone line, emergency response coordination was effectively maintained under devastating emergency conditions.

In all these experiments, the ATS-6 satellite out-performed even the expectations of the NASA engineers. The turn-around station was the GE station at Schnectady and their skill and expertise was invaluable in the overall success of the experiments. In every experiment in this series there was 100% success in the performance of all the components of the system, the ATS-6, the ATS-3 equipment of the State of California, the turn-around station, ATSOCC at Goddard, and the ground equipment.

One of the outstanding success was the transmisson via one of the briefcases of communications from a Navy Heuy helicopter via ATS-6 to Scott AFB from Yosemite, CA.

The electro-magnetic field from the motors did not interfere with the transmissions and all was clear. The briefcase batteries are very sensitive to temperature, however, and the batteries did have a limited life before re-charging due to extremes in temperature occasioned by snow at 10,000 foot elevations coupled with 75° temperatures in the Yosemite Valley floor.

The experiment system will now be on standby for the re-entry of Skylab in the event that the debris falls on land areas of the United States.

Lois Clark McCoy

Lois Clark McCoy
Principal Investigator

SURVEY FORM FOR ATS USERS 3-004

ATS & CTS INFORMATION SHEET

1. NAME: James H. Chinnick PHONE NO. (613)596-9449

2. ADDRESS: Department of Communications
Communications Research Centre,
P.O. Box 11490, Stn. H, Ottawa, Ontario. K2H 8S2

3. NASA EXPERIMENT NUMBER

4. TITLE OF EXPERIMENT: Spread-Spectrum Probing of Ocean Scattered Radiowaves at 1550 MHz.

5. DATE STARTED: 1971 DATE ENDED: 1973

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☒
ATS-6 ☐ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☐ a. Air Traffic Control	☒ f. Communications
☐ b. Maritime Traffic Control	☐ g. Medical/Health
☐ c. Broadcasting	☐ h. Meteorology
☐ d. Data Transmission	☒ i. Navigation
☐ e. Educational Applications	☐ j. Other

8. EXPERIMENT DESCRIPTION:
An M sequence was used to PSK modulate a carrier which was transmitted through the ATS-5 satellite and received on an airborne terminal over the Atlantic Ocean. Antennas were placed so as to receive both a direct and an ocean-reflected signal.

Using cross-correlation techniques it was possible to separate the direct and reflected signals by their path delay, and make direct measurements of the time spreading of the scatter mechanism

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)
"Spread Spectrum Measurements of Sea-Reflection Characteristics in an L-band Satellite-Aircraft Communications Link", J.H. Chinnick, IEEE 1972 Canadian Communications & EHV Conference.

SURVEY FORM FOR ATS USERS

3-005

ATS & CTS INFORMATION SHEET

1. NAME: James H. Chinnick PHONE NO: (613) 596-9449

2. ADDRESS: Department of Communications
~~Communications Research Centre,~~
P.O. Box 11490, Station H,
Ottawa, Ontario. K2H 8S2

3. NASA EXPERIMENT NUMBER

4. TITLE OF EXPERIMENT: Voice and Data Modem development for Aeronautical Satellite Communications

5. DATE STARTED: 1974 DATE ENDED: 1976

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☐
ATS-6 ☒ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☒ a.	Air Traffic Control	☒ f.	Communications
☐ b.	Maritime Traffic Control	☐ g.	Medical/Health
☐ c.	Broadcasting	☐ h.	Meteorology
☐ d.	Data Transmission	☐ i.	Navigation
☐ e.	Educational Applications	☐ j.	Other

8. EXPERIMENT DESCRIPTION:

Develop and test voice modems for use in an aeronautical channel having a signal-to-noise specification in the range 43-48 dB-Hz. Two voice codecs were developed at CRC, a 16 Kbps Delta and a zero-crossing based technique. These were extensively field tested with a Magnavex PDM and a Narrow band FM modem.

In addition to the formal reference listed, pertinent results were summarized in "Results of Aeronautical Satellite Modem and Antenna Evaluation Tests", J. Chinnick, March 1978, IEE conference on Maritime & Aeronautical Satellite Communications and Navigation.

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)

"Canadian Aeronautical Satellite Tests using the ATS-6 Satellite, 1974-1975", J.H. Chinnick & D. Burtt, February 1978, CRC Report No. 1308.

SURVEY FORM FOR ATS USERS 3-006

ATS & CTS INFORMATION SHEET

1. NAME: James H. Chinnick PHONE NO: (613)596-9449

2. ADDRESS: Department of Communications
Communications Research Centre,
P.O. Box 11490, Station H,
Ottawa, Ontario K2H 8S2

3. NASA EXPERIMENT NUMBER

4. TITLE OF EXPERIMENT: Development of High Gain Antennas for Aircraft-to-Satellite Communications

5. DATE STARTED: 1974 DATE ENDED: 1977

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☐
ATS-6 ☒ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☒ a.	Air Traffic Control	☒ f.	Communications
☐ b.	Maritime Traffic Control	☐ g.	Medical/Health
☐ c.	Broadcasting	☐ h.	Meteorology
☐ d.	Data Transmission	☐ i.	Navigation
☐ e.	Educational Applications	☐ j.	Other

8. EXPERIMENT DESCRIPTION:

A nine element linear phased array has been progressively developed and externsively field tested on an aircraft. Coupled to an inertial or doppler navigation system the antenna automatically beam selects and provides 7-9 dB gain over 160 degrees of upper hemispherical coverage area and a good multipath rejection factor.

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)

"Canadian Aeronautical Satellite Tests Using the ATS-6 Satellite, 1974-1975",
J. Chinnick & D. Burtt, February 1978, CRC Report No. 1308.

SURVEY FORM FOR ATS USERS 3-007

ATS & CTS INFORMATION SHEET

1. NAME: James H. Chinnick PHONE NO: (613)596-9449

2. ADDRESS: Department of Communications
Communications Research Centre
P.O. Box 1490, Station H.
Ottawa, Ontario. K2H 8S2

3. NASA EXPERIMENT NUMBER

4. TITLE OF EXPERIMENT: Study of Characteristics of L-Band Signals Scattered off the ocean At Small Angles of Incidence

5. DATE STARTED: 1976 DATE ENDED: 1976

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☐
ATS-6 ☒ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☐ a.	Air Traffic Control	☒ f.	Communications
☐ b.	Maritime Traffic Control	☐ g.	Medical/Health
☐ c.	Broadcasting	☐ h.	Meteorology
☐ d.	Data Transmission	☒ i.	Navigation
☐ e.	Educational Applications	☐ j.	Other

8. EXPERIMENT DESCRIPTION:

During the time that ATS-6 was being moved back to the Western Hemisphere, two parabolic antennas (15 and 6 feet diameter) were installed on a cliff in Newfoundland overlooking the Atlantic Ocean. Extensive measurements were made of signal polarization (RHC, LHC, V, H), relative Amplitudes and fading statistics.

The results are described in two internal publications soon to be published. The internal publications would be available to interested parties pending publication.

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)

(1) "A Report on Low Angle Ocean Scatter Measurements - August 1976" J.H. Chinnick, An Internal report dated August 1977.

(2) "Measured Effects of Ocean Scattered Multipath Fading in a Low-Elevation-Angle Satellite Channel at L-Band", J. Chinnick, S. Tsang, Internal CRC report dated April 1979.

SURVEY FORM FOR ATS USERS 3-008

ATS & CTS INFORMATION SHEET

1. NAME: James H. Chinnick PHONE NO: (613)596-9449

2. ADDRESS: Department of Communications
~~Communications Research Centre,~~
P.O. Box 11490, Station H,
Ottawa, Ontario. K2H 8S2

3. NASA EXPERIMENT NUMBER

4. TITLE OF EXPERIMENT: Ionospheric Time-Delay Variations in a Satellite-to-Ground Signal Path.

5. DATE STARTED: 1978 DATE ENDED: 1979

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☐
ATS-6 ☐ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☐ a.	Air Traffic Control	☐ f.	Communications
☐ b.	Maritime Traffic Control	☐ g.	Medical/Health
☐ c.	Broadcasting	☐ h.	Meteorology
☐ d.	Data Transmission	☒ i.	Navigation
☐ e.	Educational Applications	☐ j.	Other

8. EXPERIMENT DESCRIPTION:

The NAVSTAR navigation system depends for its operation on the ability to accurately model the effects of ionospheric path delays. The purpose of this experiment was to measure the significance of those short-term variations in this time delay which are not included in the model.

Final analysis of this data is not completed but a preliminary report has been written and is listed below.

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)

"A Report on an Experiment to Measure the Group Path Delay Variation in a Ground-to-Spacecraft & Link at Mid-and Northern Latitudes", J.H. Chinnick, March 1979, CRC Technical Memorandum SS-5

SURVEY FORM FOR ATS USERS 3-009

ATS & CTS INFORMATION SHEET

1. NAME: Roy E. Anderson PHONE NO: 518-385-2746

2. ADDRESS: General Electric Company
P. O. Box 43, Bldg. 37, Room 559
Schenectady, New York 12301

3. NASA EXPERIMENT NUMBER Contract Number NAS5-24365

4. TITLE OF EXPERIMENT: Satellite-Aided Mobile Communications Limited Operational Test in the Trucking Industry

5. DATE STARTED: 11/30/77 DATE ENDED: 7/31/79

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☐
ATS-6 ☒ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☐ a. Air Traffic Control	☒ f. Communications
☐ b. Maritime Traffic Control	☐ g. Medical/Health
☐ c. Broadcasting	☐ h. Meteorology
☐ d. Data Transmission	☐ i. Navigation
☐ e. Educational Applications	☐ j. Other _____

8. EXPERIMENT DESCRIPTION:

Equip five over-the-road trucks and a dispatch base station with voice communications by satellite. Trucking company is Smith Transfer, Staunton, VA. Area served is Georgia to Pennsylvania, west to Nebraska. Experiment control and data recording are at GE Observatory near Schenectady, NY. Experiment modified to equip two search and rescue jeeps of Air Force for use in simulated and actual disaster relief and search and rescue missions.

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)

SURVEY FORM FOR ATS USERS 3-010

ATS & CTS INFORMATION SHEET

1. NAME: Roy E. Anderson PHONE NO: 518-385-2746

2. ADDRESS: General Electric Company
P. O. Box 43, Bldg. 37, Room 559
Schenectady, New York 12301

3. NASA EXPERIMENT NUMBER Contract NAS5-20034

4. TITLE OF EXPERIMENT: ATS-5 Trilateration Support

5. DATE STARTED: November 1973 DATE ENDED: December 1975

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☒
ATS-6 ☐ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☐ a.	Air Traffic Control	☐ f.	Communications
☐ b.	Maritime Traffic Control	☐ g.	Medical/Health
☐ c.	Broadcasting	☐ h.	Meteorology
☐ d.	Data Transmission	☐ i.	Navigation
☐ e.	Educational Applications	☐ j.	Other Satellite Tracking

8. EXPERIMENT DESCRIPTION:

L-band tone-code ranging transponders were located in Argentina and Hawaii. Tone code ranging signals were transmitted from GE Radio Optical Observatory near Schenectady, NY via ATS-5 to the distant transponders, resulting in range measurements to the satellite from Schenectady, Argentina and Hawaii. The measurements were used in trilateration computations to determine satellite location in real time. Agreement with best NASA independent tracking was 0.0002° in latitude and longitude, 20 meters in earth center distance.

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)

Final Report "ATS-5 Trilateration Support", GE Company report SRD-76-004.

SURVEY FORM FOR ATS USERS 3-011

ATS & CTS INFORMATION SHEET

1. NAME: Roy E. Anderson PHONE NO: 518-385-2746

2. ADDRESS: General Electric Company
Bldg. 37, Room 559, P. O. Box 43
Schenectady, New York 12301

3. NASA EXPERIMENT NUMBER Contract No. NAS5-25135

4. TITLE OF EXPERIMENT: Position Surveillance Using one Active Ranging Satellite and Time of Arrival of a Signal from an Independent Satellite

5. DATE STARTED: 12/27/78 DATE ENDED: 10/27/79

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☐
ATS-6 ☒ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☐ a.	Air Traffic Control	☐ f.	Communications
☐ b.	Maritime Traffic Control	☐ g.	Medical/Health
☐ c.	Broadcasting	☐ h.	Meteorology
☐ d.	Data Transmission	☒ i.	Navigation
☐ e.	Educational Applications	☐ j.	Other _____

8. EXPERIMENT DESCRIPTION:
Test a new GE concept that requires only one active ranging-communication satellite. A ship on the Great Lakes or an inland waterway will be equipped with a mobile communications radio adapted for ATS-6 and a tone-code ranging responder. The ship will also carry a receiver for timing signals from the NOAA GOES satellite. When the ship is interrogated via ATS-6, its response will include timing information derived from the GOES signal. Ship positions will be computed at GE's Radio Optical Observatory.

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)

SURVEY FORM FOR ATS USERS 3-012

ATS & CTS INFORMATION SHEET

1. NAME: Roy E. Anderson PHONE NO: 518-385-2746

2. ADDRESS: General Electric Company
P. O. Box 43, Building 37, Room 559
Schenectady, New York 12301

3. NASA EXPERIMENT NUMBER

4. TITLE OF EXPERIMENT: Application of Satellite Communications and Position Fixing to Land Mobile Systems

5. DATE STARTED: January 1976 DATE ENDED: November 1976

6. SATELLITE DESIGNATION: ATS-1 [X] ATS-3 [X] ATS-5 [ ]
ATS-6 [ ] CTS [ ]

7. SUBJECT CATEGORY OF EXPERIMENT

[ ] a.	Air Traffic Control	[X] f.	Communications
[ ] b.	Maritime Traffic Control	[ ] g.	Medical/Health
[ ] c.	Broadcasting	[ ] h.	Meteorology
[ ] d.	Data Transmission	[X] i.	Navigation
[ ] e.	Educational Applications	[ ] j.	Other

8. EXPERIMENT DESCRIPTION:

Experiment conducted under contract DEA-76-20 for Drug Enforcement Administration and Immigration and Naturalization Service. A station wagon was equipped with a mobile radio adapted to the VHF transponders of ATS-1,3. A base station was installed first in Washington, DC. later in Tucson Arizona. Experiment control was at GE Observatory, near Schenectady. Voice, data, slow scan TV signals were exchanged between vehicle and fixed stations. The vehicle was located in real time by tone code ranging. Accuracy of location was a small fraction of a mile.

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)

Final Report "Application of Satellite Communication and Position Fixing to Land Mobile Systems", Brisken, A. F., Frey, R. L., Anderson, R. E., GE Co. report SRD-77-001.

SURVEY FORM FOR ATS USERS

ATS & CTS INFORMATION SHEET

3-013

1. NAME: Kenneth Davies PHONE NO: (303) 499-1000 3569

2. ADDRESS: NOAA/ERL/SEL/R43
325 Broadway
Boulder, CO 80303

3. NASA EXPERIMENT NUMBER

4. TITLE OF EXPERIMENT: ATS6 Radio Beacon Experiment

5. DATE STARTED: June 1974 DATE ENDED: Continuing

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☐
ATS-6 ☒ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

- ☐ a. Air Traffic Control
- ☐ b. Maritime Traffic Control
- ☐ c. Broadcasting
- ☐ d. Data Transmission
- ☐ e. Educational Applications
- ☒ f. Communications
- ☐ g. Medical/Health
- ☐ h. Meteorology
- ☐ i. Navigation
- ☐ j. Other RESEARCH

8. EXPERIMENT DESCRIPTION: Phase stable radio transmissions from CW transmitters on 40, 140 and 360 MHz aboard ATS6 are used to measure: 1) the total electron content along raypaths from the satellite to ground receivers, 2) the electron content along these raypaths up to an altitude of 2000 km. Measurements at many locations with the ATS6 at (a) 94° W (b) 35° E and (c) 140° W have enable determination of the geographical and temporal variations of the various electron contents. Over the U.S.A. the plasmaspheric content maximizes at night in winter whereas in Europe it maximizes during the day. Extensive observations of radio scintillations, caused by ionospheric irregularities, have been made.

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)

Davies, K., 1979, Recent progress in satellite radio beacon studies with particular emphasis on the ATS6 Radio Beacon Experiment, (Review), Space Science Reviews 21, in press.

SURVEY FORM FOR ATS USERS 3-014

ATS & CTS INFORMATION SHEET

1. NAME: A.G. Thiessen, President PHONE NO:(615)899-9393

2. ADDRESS: Sterling Communications
Uptain Bldg., Ste.418
Chattanooga, Tn. 37411

3. NASA EXPERIMENT NUMBER

4. TITLE OF EXPERIMENT: Project Look up

5. DATE STARTED: DATE ENDED:

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☐
ATS-6 ☒ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☐ a.	Air Traffic Control	☐ f.	Communications
☐ b.	Maritime Traffic Control	☐ g.	Medical/Health
☒ c.	Broadcasting	☐ h.	Meteorology
☐ d.	Data Transmission	☐ i.	Navigation
☒ e.	Educational Applications	☐ j.	Other

8. EXPERIMENT DESCRIPTION:

Initiated the project and served as chairman several years. Currently is conducting test broadcasts in Spanish to target areas in Carribean, with special emphasis on Puerto Rico.

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)

May be obtained from Project Lookup Office in Clearwater, Florida.

SURVEY FORM FOR ATS USERS 3-015

ATS & CTS INFORMATION SHEET

1. NAME: F. O. Vonbun PHONE NO: 344-5201

2. ADDRESS: NASA/Goddard Space Flight Center, Code 900/Applications Directorate, Greenbelt, MD 20771

3. NASA EXPERIMENT NUMBER MA-128

4. TITLE OF EXPERIMENT: Apollo-Soyuz Geodynamics Experiment

5. DATE STARTED: DATE ENDED:

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☐ ATS-6 ☐ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☐ a.	Air Traffic Control	☐ f.	Communications
☐ b.	Maritime Traffic Control	☐ g.	Medical/Health
☐ c.	Broadcasting	☐ h.	Meteorology
☐ d.	Data Transmission	☐ i.	Navigation
☐ e.	Educational Applications	☒ j.	Other Geophysics

8. EXPERIMENT DESCRIPTION:

The objectives of the Apollo-Soyuz Test Project (ASTP) Geodynamics Experiment were threefold. (1) To demonstrate the detectability of short-wavelength (i.e. 300 km and larger) features of the Earth gravity field; (2) To evaluate the "high/low" satellite-to-satellite tracking (SST) concept for geodynamics applications; (3) To test the recoverability of short-wavelength features of the Earth gravity field.

This experiment was the culmination of an effort to utilize synchronous orbiting tracking stations for NASA missions. The use of a low-orbiting spacecraft (approximately 230 km) continuously tracked by a synchronous satellite has, for the first time, led to the detection of short-wavelength Earth gravity anomalies.

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)

"Gravity Anomalies Determined from Tracking the Apollo-Soyuz", NASA TM 78031, F.O. Vonbur 12/77

"Apollo-Soyuz Test Project: Summary Science Report", Vol. 1, NASA SP-412

"Probing the Earth's gravity field by means of satellite-to-satellite tracking" F.O. Vonbun, 1977, Phil. Trans. R. Soc. Land.A. 284, 475-485

SURVEY FORM FOR ATS USERS 3-016

ATS & CTS INFORMATION SHEET

1. NAME: F.O. Vonbun PHONE NO:(301) 344-5201

2. ADDRESS: NASA/Goddard Space Flight Center, Code 900, Applications Directorate, Greenbelt, MD 20771

3. NASA EXPERIMENT NUMBER: No number

4. TITLE OF EXPERIMENT: Tracking & Data Relay Experiment

5. DATE STARTED: 1968 DATE ENDED: 1978

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☐ ATS-6 ☒ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☐ a.	Air Traffic Control	☐ f.	Communications
☐ b.	Maritime Traffic Control	☐ g.	Medical/Health
☐ c,	Broadcasting	☐ h.	Meteorology
☐ d.	Data Transmission	☐ i.	Navigation
☐ e.	Educational Applications	☒ j.	Other Orbit analyses

8. EXPERIMENT DESCRIPTION:

Determine if and to what accuracy can an orbit of a near earth satellite be determined using a synchronous (or near synchronous) spacecraft as the "tracking station".

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)

4 papers enclosed

SURVEY FORM FOR ATS USERS 3-017

ATS & CTS INFORMATION SHEET

1. NAME: Dr. Garry C. Hess PHONE NO:(312)576-3809

2. ADDRESS: Rm 2907, RF Systems Lab., Motorola, Inc.,
1301 E. Algonquin Road
Schaumburg, Ill. 60196

3. NASA EXPERIMENT NUMBER Unknown, 3rd year ATS-6 exp't.

4. TITLE OF EXPERIMENT: Land Mobile Satellite Path Loss Measurements

5. DATE STARTED: July 14, 1977 DATE ENDED: Sept. 6, 1978

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☐
ATS-6 ☒ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☐ a. Air Traffic Control	☒ f. Communications
☐ b. Maritime Traffic Control	☐ g. Medical/Health
☐ c, Broadcasting	☐ h. Meteorology
☐ d. Data Transmission	☐ i. Navigation
☐ e. Educational Applications	☐ j. Other _____

8. EXPERIMENT DESCRIPTION:

Excess path loss over free-space loss was measured for the land-mobile case as a function of (1) local environment, (2) vehicle heading, (3) link frequency, (4) satellite elevation angle, and (5) street side. An excess path loss model was developed from the data for prediction of temporal/spatial coverage. Small scale signal behavior was characterized through level crossing rates and average fade durations.

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)
"Land-Mobile Satellite Excess Path Loss Measurements," G.C. Hess, 29th IEEE Vehicular Technology Conference, March 27-30,1979, Arlington Heights, Ill. Also, Experiment Final Report submitted Sept. 6,1978 to NASA-GSFC c/o Dr. James P. Brown

SURVEY FORM FOR ATS USERS
ATS & CTS INFORMATION SHEET

1. NAME: Project Look Up PHONE NO: 813 461-3633

2. ADDRESS: P O Box 5106
Clearwater FL 33519

3. NASA EXPERIMENT NUMBER

4. TITLE OF EXPERIMENT: Project Look Up

5. DATE STARTED: Jan 1976 DATE ENDED: incomplete

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☐
ATS-6 ☒ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☐ a. Air Traffic Control	☐ f. Communications
☐ b. Maritime Traffic Control	☒ g. Medical/Health
☒ c. Broadcasting	☐ h. Meteorology
☐ d. Data Transmission	☐ i. Navigation
☒ e. Educational Applications	☐ j. Other

8. EXPERIMENT DESCRIPTION:
Project Look Up is using the ATS-6 research staellite to provide human services to Latin America. The unique contribution of this proposal to the ATS-6 research data collected thus far is 1) a concentrated effort in helping the whole man in health, education, employment, culture and morals, and 2) an experiment on the performance of antennae and receiving television sets in tropical rain forests, and 3) an experiment in opening new areas of exchange for culture, ideas and manufactured products.

One-way communications will be emphasized originating at the ground station at Rosman, North Carolina. Antennae and receiving sets will be placed in strategic locations to obtain proper groupings and measurable conditions.

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)

1976 Progress Report

1979 Progress Report

SURVEY FORM FOR ATS USERS 3-019

ATS & CTS INFORMATION SHEET

1. NAME: Paul E. Schmid PHONE NO: (301) 344-5320

2. ADDRESS: Code 932
NASA-Goddard Space Flight Center
Greenbelt, MD 20771

3. NASA EXPERIMENT NUMBER

4. TITLE OF EXPERIMENT: ATS-6/Nimbus-6 Tracking & Data Relay Experiment

5. DATE STARTED: 1975 DATE ENDED: 1978

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☐
ATS-6 ☒ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☐ a.	Air Traffic Control	☐ f.	Communications
☐ b.	Maritime Traffic Control	☐ g.	Medical/Health
☐ c.	Broadcasting	☐ h.	Meteorology
☒ d.	Data Transmission	☐ i.	Navigation
☐ e.	Educational Applications	☒ j.	Other Satellite-to-Satellite Tracking & Orbit Determination

8. EXPERIMENT DESCRIPTION: The purpose of the experiment was to provide experience and information, using the ATS-6 satellite, which could be used in designing future Tracking &Data Relay Satellite (TDRS) systems. The specific objectives were to:

- o Determine the extent which the orbit of a low orbiting spacecraft can be established from another higher orbiting spacecraft
- o Demonstrate the technology of command and telemetry data transmission between a low altitude satellite and a ground station using a geosynchronous satellite as a communications relay.

The experiment was highly successful, demonstrating that satellite-to-satellite tracking and orbit computation was indeed feasible and that a high gain unfurlable antenna could be used for data relay.

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)

1. P. E. Schmid, B.J. Trudell, and F. O. Vonbun, "Satellite to Satellite Tracking and Data Relay Experiments", IEEE AES Transactions Vol. AES-11, NR. 6, p 1048-1058, November 1975.

2. P. E. Schmid, and F. O. Vonbun, "The ATS-F/Nimbus-F Tracking and Orbit Computation Experiment", Proceedings of 1974 IEEE INTERCON, NY City, March 26-29, 1974.

SURVEY FORM FOR ATS USERS 3-020

ATS & CTS INFORMATION SHEET

1. NAME: K.C. Yeh PHONE NO:(217)333-2930

2. ADDRESS: University of Illinois, Department of Electrical Eng. Urbana, Ill. 61801

3. NASA EXPERIMENT NUMBER Not supported by NASA

4. TITLE OF EXPERIMENT: ATS-F Radio Beacon Experiment

5. DATE STARTED: Oct. 1, 1975 DATE ENDED: Sept. 30, 1976

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☐
ATS-6 ☒ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☐ a.	Air Traffic Control	☐ f.	Communications
☐ b.	Maritime Traffic Control	☐ g.	Medical/Health
☐ c,	Broadcasting	☐ h.	Meteorology
☐ d.	Data Transmission	☐ i.	Navigation
☐ e.	Educational Applications	☒ j.	Other _____

8. EXPERIMENT DESCRIPTION:

1. To study and measure the electron content in the plasmasphere.
2. To study the behavior of scintillation signals.

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)

Two reprints attached. Also "Radio Beacon Studies of the Plasmasphere" by D.A. Poletti-Luzzi, K.C. Yeh and C.H. Liu, Journal of Geophysical Research, Vol. 82,1106-1114, 1977.

SURVEY FORM FOR ATS USERS

3-021

ATS & CTS INFORMATION SHEET

1. NAME: E.P. Buckley PHONE NO:(609)641-8200

2. ADDRESS: FAA-NAFEC
Atlanta City, New Jersey 08403

3. NASA EXPERIMENT NUMBER _____

4. TITLE OF EXPERIMENT: _____

5. DATE STARTED: DATE ENDED:

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☐
ATS-6 ☐ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☐ a. Air Traffic Control	☐ f. Communications
☐ b. Maritime Traffic Control	☐ g. Medical/Health
☐ c, Broadcasting	☐ h. Meteorology
☐ d. Data Transmission	☐ i. Navigation
☐ e. Educational Applications	☐ j. Other _____

8. EXPERIMENT DESCRIPTION:

Experiment was considered but cancelled.

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)

SURVEY FORM FOR ATS USERS

ATS & CTS INFORMATION SHEET

3-022

1. NAME: John W. Marimi PHONE NO:(301)344-6829

2. ADDRESS: GSFC
Greenbelt, Md. 20771

3. NASA EXPERIMENT NUMBER None

4. TITLE OF EXPERIMENT:

5. DATE STARTED: DATE ENDED:

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☐
ATS-6 ☐ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☐ a. Air Traffic Control	☐ f. Communications
☐ b. Maritime Traffic Control	☐ g. Medical/Health
☐ c, Broadcasting	☐ h. Meteorology
☐ d. Data Transmission	☐ i. Navigation
☐ e. Educational Applications	☐ j. Other

8. EXPERIMENT DESCRIPTION:

Not approved.

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)

SURVEY FORM FOR ATS USERS

3-023

ATS & CTS INFORMATION SHEET

1. NAME: C. Peter Marini PHONE NO: (813) 893-3145

2. ADDRESS: U. S. Department Of Commerce, NOAA
National Marine Fisheries Service
9450 Koger Blvd., St. Petersburg, FL 33702

3. NASA EXPERIMENT NUMBER _____

4. TITLE OF EXPERIMENT: _____

5. DATE STARTED: DATE ENDED:

6. SATELLITE DESIGNATION: ATS-1 ☐ ATS-3 ☐ ATS-5 ☐
ATS-6 ☒ CTS ☐

7. SUBJECT CATEGORY OF EXPERIMENT

☐ a. Air Traffic Control	☒ f. Communications
☐ b. Maritime Traffic Control	☐ g. Medical/Health
☐ c. Broadcasting	☐ h. Meteorology
☐ d. Data Transmission	☐ i. Navigation
☐ e. Educational Applications	☐ j. Other _____

8. EXPERIMENT DESCRIPTION:

As yet, we have not started our experiment.

9. REPORTS THAT WOULD BE USEFUL TO UDRI IN SUMMARIZING EXPERIMENT RESULTS (Title, Author, Date, I.D. Number)